

NOTES:

MESSANGER CABLE SHALL NOT BE ATTACHED ABOVE 18" FROM THE TOP OF THE POLE.

ALL ALUM. PIPE FOR BRACKET ARMS, DROP PIPE, & OTHER APPLICATIONS SHALL BE STD. WT., SCHED. 40.

ALL GALV. PIPE & CONDUIT FITTINGS SHALL BE STEEL OR MALLEABLE IRON (150 LB TEST)

ALL STEEL CONDUIT SHALL BE IN COMPLIANCE WITH SPEC. 725.04

ALL PVC CONDUIT & FITTINGS SHALL BE TYPE II (SCHED. 40)

ALL MESSANGER CABLE SHALL BE COPPER COVERED STEEL, 7 STRAND, ASTM B-228, GRADE 30 EHS. REFER TO PLAN FOR SIZE.

② SPLIT BOLT CONNECTOR, DOSSERT, BLACKBURN, McGRAW-EDISON, OR APPROVED EQUAL. CONNECT MESS. CA., LASHING WIRE, & GROUND WIRE.

③ GALV. STEEL OR MALLEABLE IRON DOUBLE HOLE PIPE STRAPS EVERY 2' MAX.

④ DRILL 3/8" DRAIN HOLE IN LOWEST PART OF CABINETS & FITTINGS

⑤ #6 AWG. BARE COPPER GROUND WIRE. ROUTE INTERNALLY IN STEEL POLE TO POLE GRD. LUG. FOR WOOD POLES, ROUTE EXTERNALLY TO POLE GROUND WIRE.

⑥ SEE STANDARDS DWG ES-3-4 FOR TYPICAL SPAN WIRE ASSEMBLY DETAIL.

⑦ SERVE WITH 5" TO 7" MAUSE OR SELF WRAP THROUGH THIMBLE EYE BOLT. 3 BOLT CABLE CLAMP TO BE REMOVED AFTER CABLE ENDS HAVE BEEN MAUSED.

⑧ GROUNDING LUGS FOR CABINETS SHALL BE: BLACKBURN L-125, T & B1300 SERIES OR APPVD. EQUAL. FOR ALUMINUM SIGNALS ONLY.

⑨ 4 TURNS OF PLASTIC TAPE OR NYLON CABLE TIES (OUTDOOR USEAGE TYPE).

MAINTAIN DRIP LOOPS ON ALL WEATHERHEAD ENTRIES.

POLE BRACKETS SHALL BE ALUMINUM W/PLATE CURVED TO CONTOUR OF POLE AND FOR 1 1/2" PIPE BRACKET ARMS.

① UPPER BRACKET W/1 1/4" HUB FOR EXTERNAL CONDUIT ENTRY; EAGLE SIGNAL CO. #U1159, GENERAL TRAFFIC EQUIP. CORP. #11001 24A OR APPROVED EQUAL.

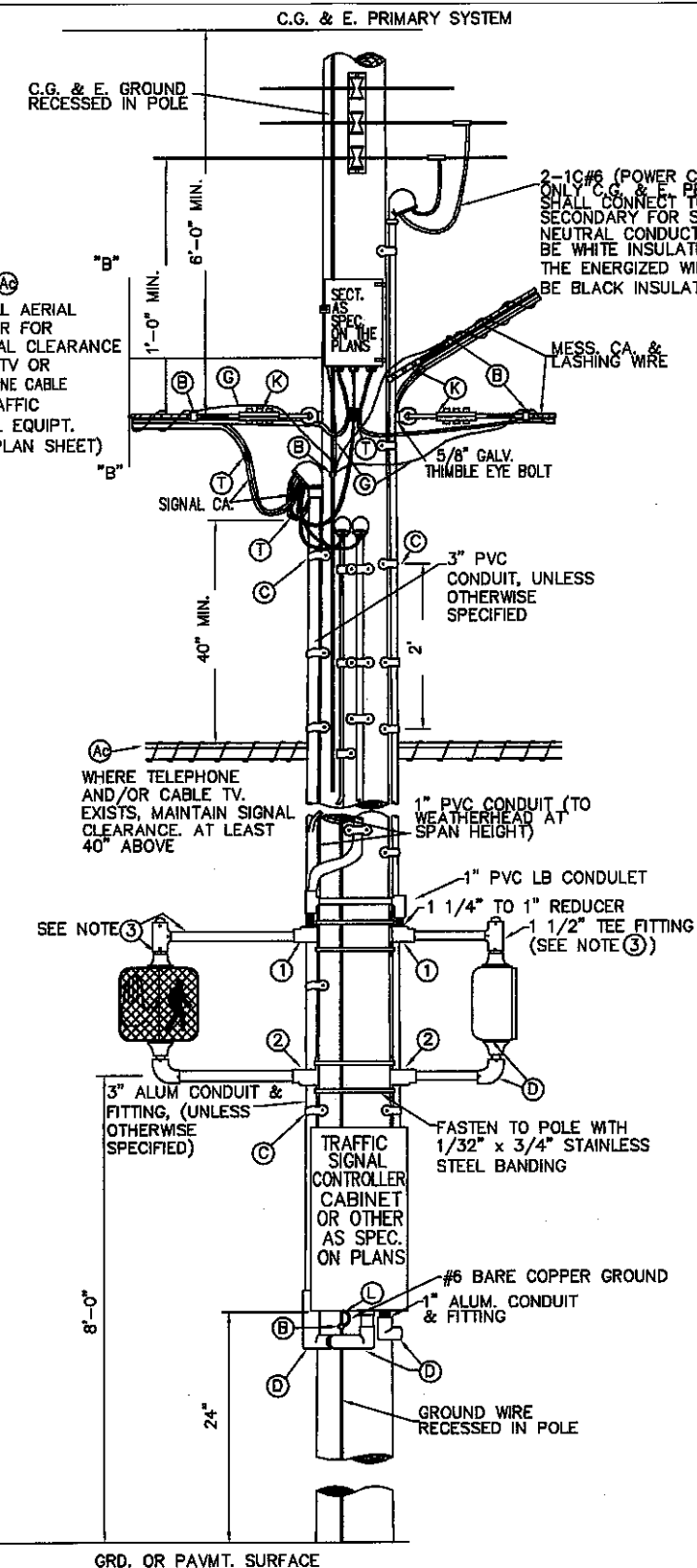
② LOWER BRACKET W/O HUB; EAGLE SIGNAL CO. #U1158, GENERAL TRAFFIC EQUIP. CORP. #1100123A, OR APPROVED EQUAL.

③ PEDESTRIAN SIGNAL BRACKET SUPPORTS: 1 1/2 INCH ALUMINUM WITH ALUM. FITTINGS FOR PED. SIGNAL, OR CLAMSHELL MOUNTING ON STEEL POLES.

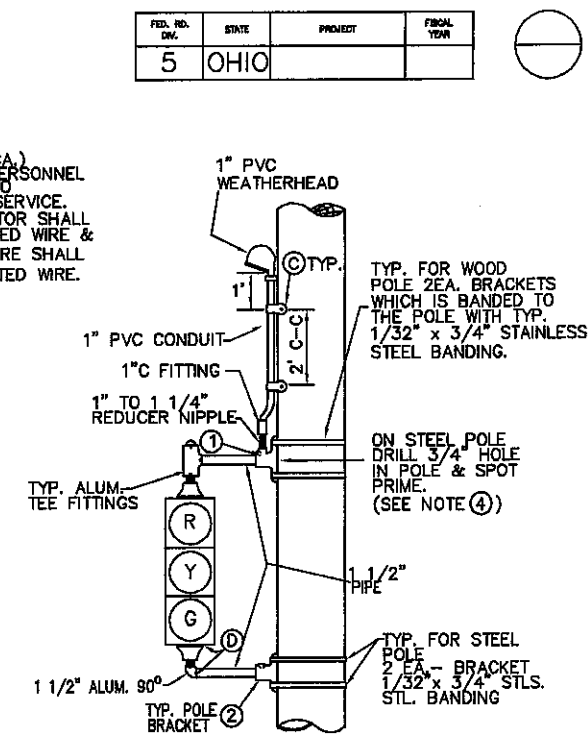
④ SPOT PRIME EXPOSED SURFACES WITH "ZINC 1T" OR APPROVED COLD GALVANIZING COATING. (SEE SPEC. ITEM 1317)

⑤ HANDHOLE ON CONTROLLER POLE (90° OR 270°) LOCATED AS SPECIFIED.

NOTE: SPECIFICATION NUMBERS REFER TO STATE OF OHIO, DEPT. OF TRANSP., "CONST. & MATERIALS SPECS", OR ASTM SPECS.



S.C.H.	<i>Edw</i>	8/13/04	UPDATE
T.E.		3/1/98	
DESIGN	REVISION	DATE	WD #
	APPROVED	9/14/94	



BRACKET ARM ATTACHMENT

③ CONDUIT CLAMPS
USE DOUBLE
HOLE TYPE.

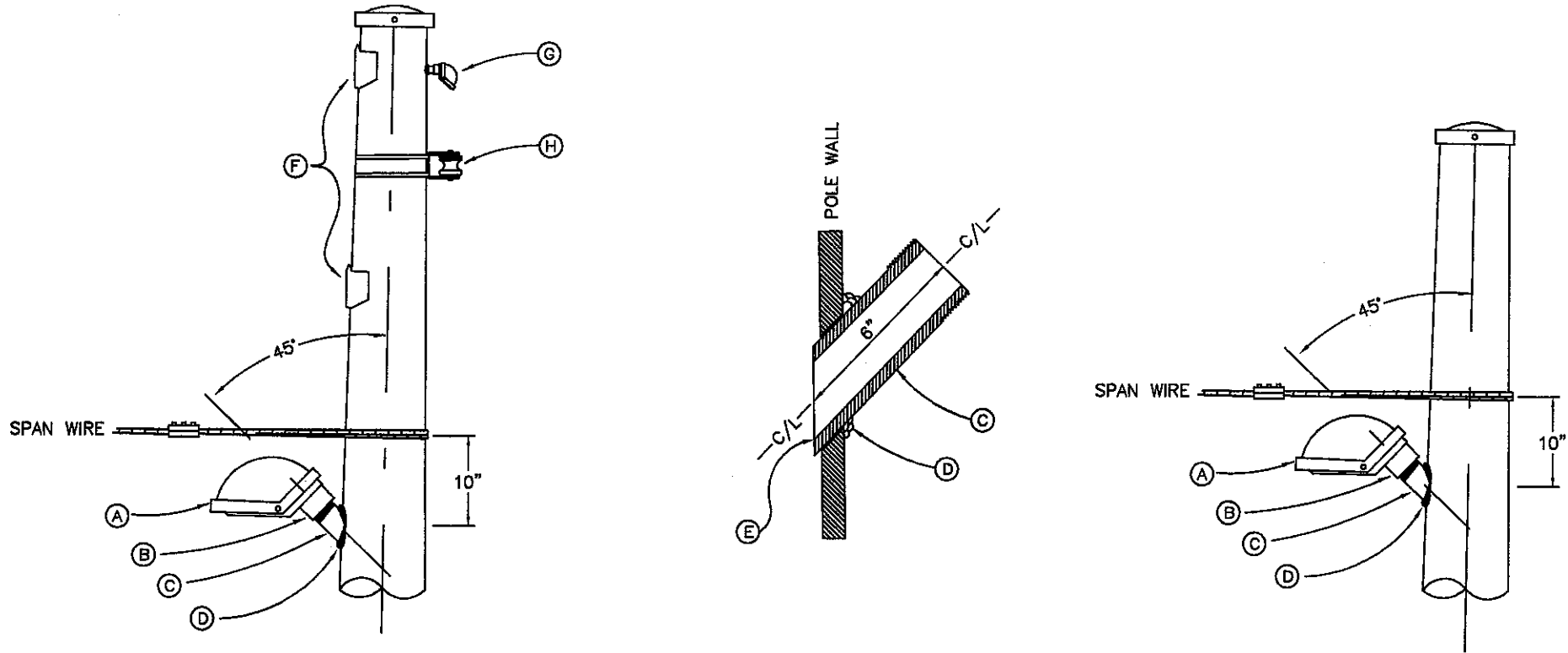


SECURE WITH
2-1/2" LG.
GALV. NAILS

TOP VIEW DOUBLE HOLE
STRAP & RISER

TRAFFIC SIGNAL INSTALLATIONS (ES-3)			
TRAFFIC SIGNAL SPAN WIRE INSTALLATION			
CITY OF CINCINNATI DEPT. OF TRANSPORTATION & ENGINEERING DIV. OF TRAFFIC ENGR.			
APPROVED <u>Stone Bailey</u>		DATE <u>3-4-99</u>	
SCALE	SOURCE	DRAWN	FILE NO.
			ES-3-2

CABLE ENTRANCE DETAIL, SIGNAL & LIGHTING POLES



NOTE:

- (A) WEATHERHEAD, PVC SCHD. 40 CARLON MFD. OR APPROVED EQUAL, SEE MATERIAL SCHEDULE CHART FOR EACH INTERSECTION TO DETERMINE SERVICE ENTRANCE SIZE. PROVIDE MIN. DRIP LOOP OF 1FT.
- (B) FEMALE ADAPTER, PVC SCHD. 40 CARLON MFD. OR APPROVED EQUAL, SEE MATERIAL SCHEDULE CHART FOR SIZE.
- (C) USE A 12" SCHD. 40 RMC GALV. NIPPLE, MAKE A 45° CUT TO OBTAIN 2 EQUAL LENGTHS. SEE MATERIAL SCHEDULE CHART FOR SIZE. NIPPLE TO PIERCE POLE WALL.
- (D) MUST BE A CONTINUOUS WELD. CLEAN WELDED AREA AND COAT WITH A COLD GALVANIZING PAINT, "ZINC-IT" BY CRC CHEMICAL COMPANY, OR APPROVED EQUAL.
- (E) DEBUR AND CHAMFER FOR SMOOTH CABLE ACCESS.
- (F) FACTORY INSTALLED POLE PLATES FOR MOUNTING STREET LIGHT BRACKET ARM, CONTRACTOR TO INSTALL BRACKET ARM WITH 2 #10 WIRES, FOR LUMINAIRE POWER.
- (G) FACTORY INSTALLED 1-1/2" HALF COUPLING WITH CONTRACTOR INSTALLED 1" WEATHERHEAD, PVC SCHD. 40 CARLON MFD. OR APPROVED EQUAL, USED FOR LUMINAIRE POWER CABLE. IF HALF COUPLING MISSING INSTALL WEATHERHEAD ON TOP OF POLE CAP.
- (H) CONTRACTOR INSTALLED CLEVIS & INSULATOR, (SINGLE BALL RACK). ATTACH WITH 3/4" X 0.030" STAINLESS STEEL BANDING.



TRAFFIC SIGNAL INSTALLATIONS (ES-3)

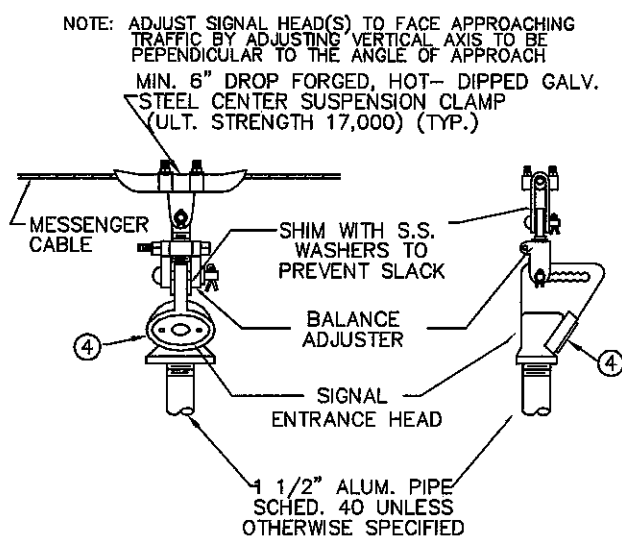
NIPPLE INSTALLATION DETAILS

CITY OF CINCINNATI
DEPT. OF TRANSPORTATION & ENGINEERING
DIV. OF TRAFFIC ENGR.

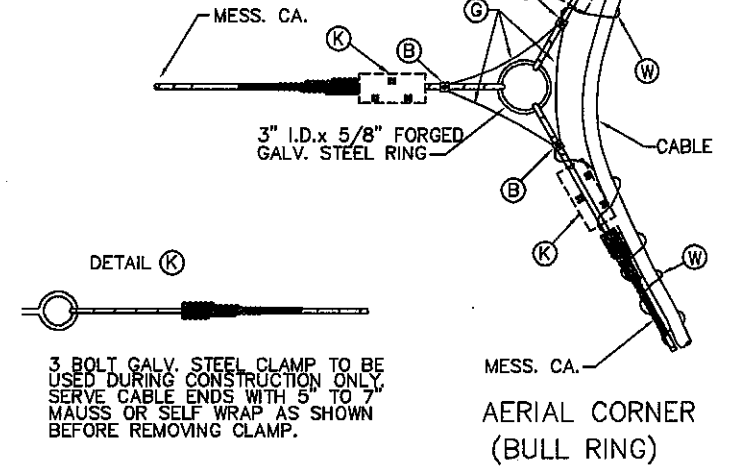
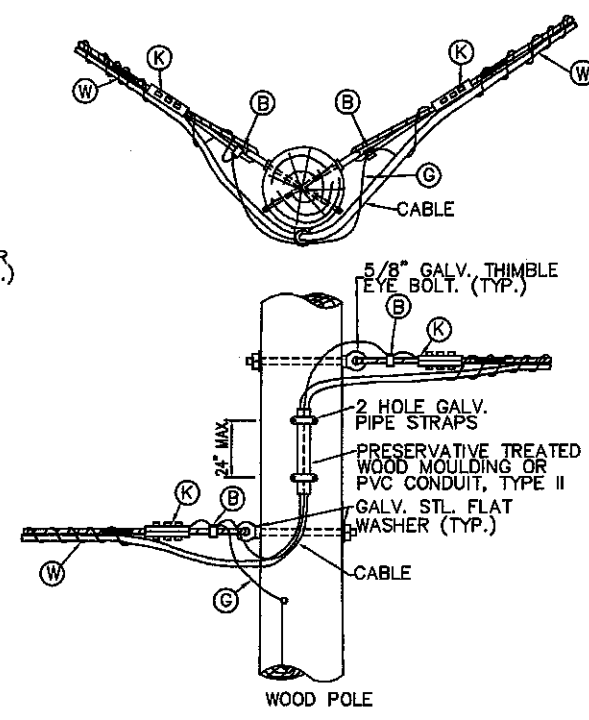
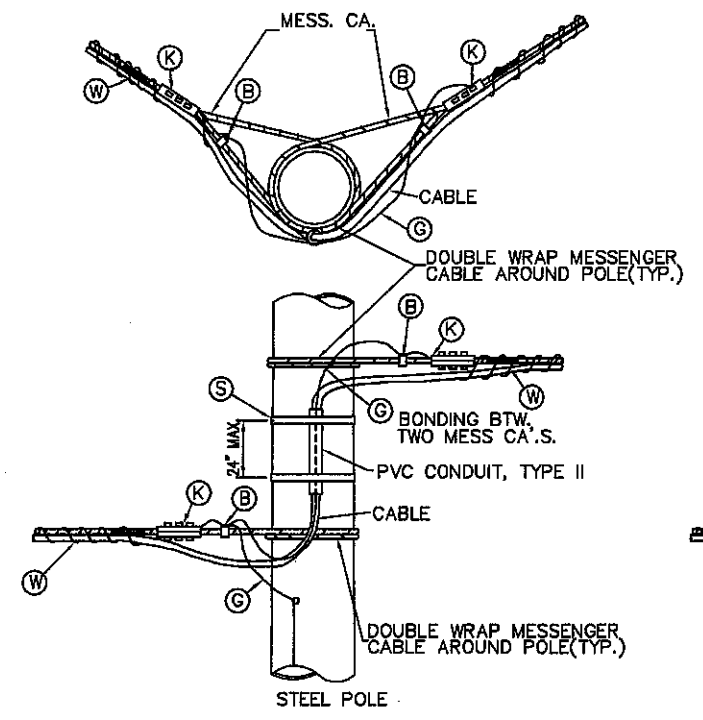
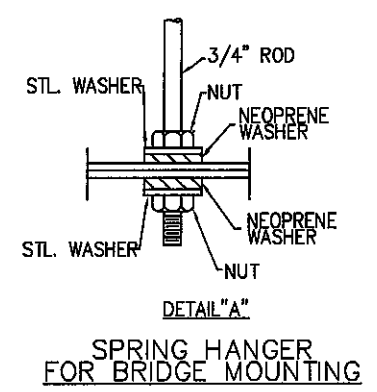
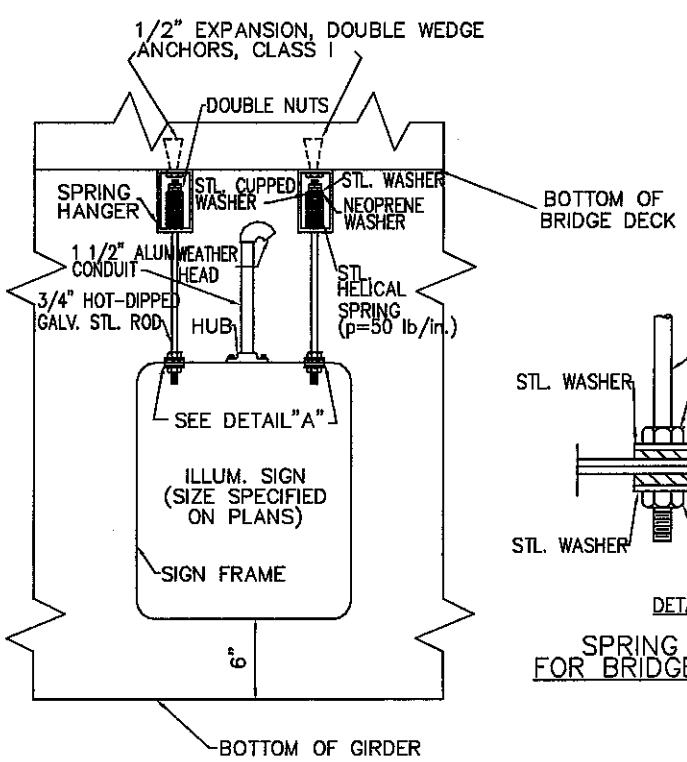
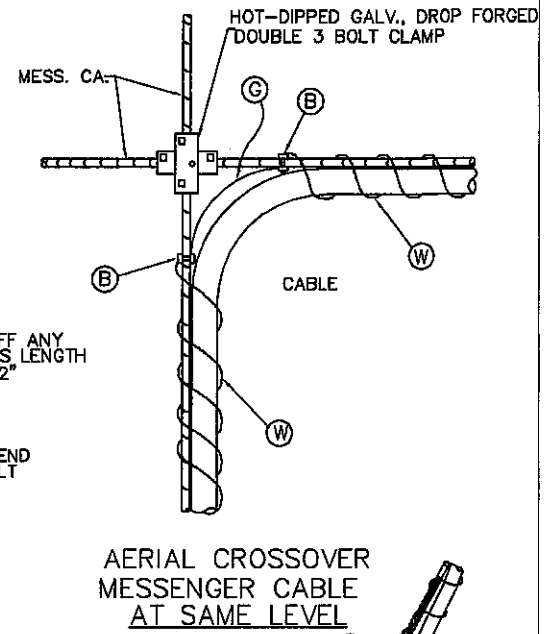
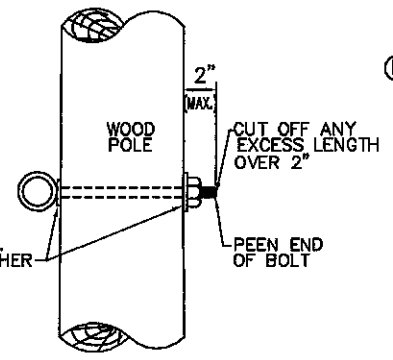
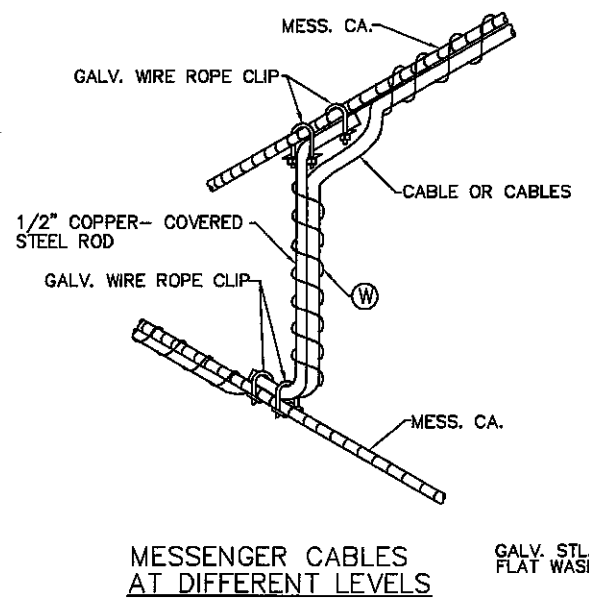
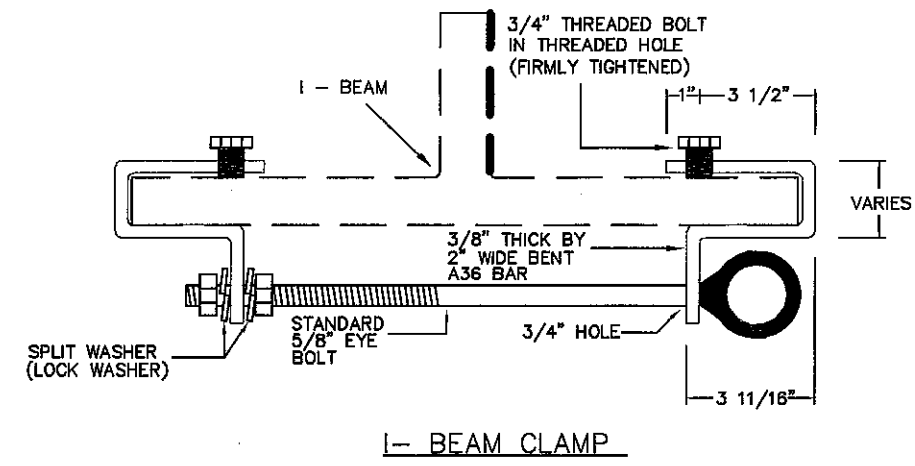
APPROVED: *Steve Bailey* DATE: 4/27/05

C.T.		12/10/10	UPDATE
S.C.H.		8/13/04	
T.E.		3/1/98	
DESIGN	REVISION	DATE	NO.
	APPROVED	9/14/94	

SCALE	SOURCE	DRAWN	FILE NO.
			ES-3-3



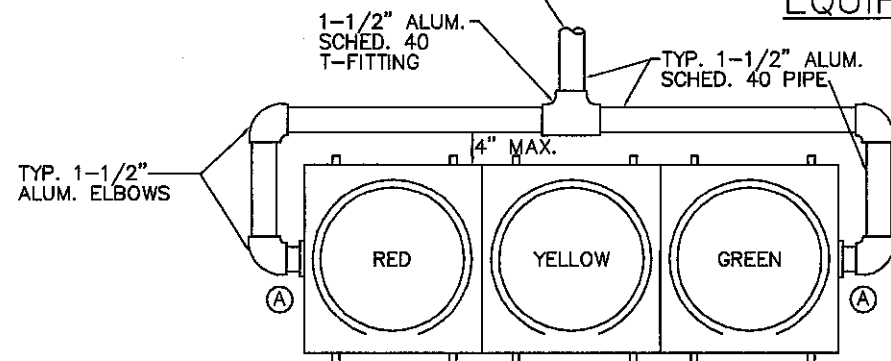
* BALANCE ADJUSTER REQUIRED FOR ALL SIGNAL HEADS. NOT NORMALLY REQUIRED FOR SIGNS.
TYPICAL SPAN WIRE HANGER ASSEMBLY



- GENERAL NOTES
- (B) SPLIT BOLT CONNECTOR; DOSSERT, BLACKBURN, McGRAW-EDISON, OR APPVD. EQUAL
 - (G) #6 AWG. SOLID BARE COPPER GROUND WIRE
 - (K) 3 BOLT CLAMP (SEE DETAIL).
 - (S) 1/16"x 7/8" STAINLESS STEEL POLE BANDING
 - (W) #14 BARE COPPER LASHING WIRE OR #12 PREFORMED COPPER LASHING RODS
 - (4) BALANCE ADJUSTER & SIGNAL ENTRANCE HEAD MUST BE INSTALLED WITH WIRE ENTRANCE FACING APPROACHING TRAFFIC.

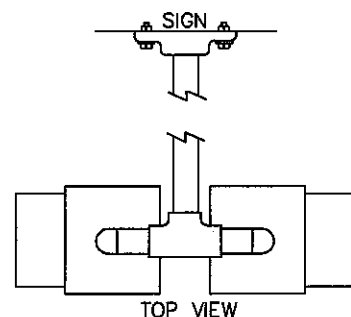
TRAFFIC SIGNAL INSTALLATIONS (ES-3)			
AERIAL & BEAM ATTACHMENTS & HARDWARE			
CITY OF CINCINNATI DEPT. OF TRANSPORTATION & ENGINEERING DIV. OF TRAFFIC ENGR.			
S.C.H.	8/18/04	UPDATE	
T.E.	3/1/98		
DESIGN	REVISION	DATE	NO.
	APPROVED	12/07/94	
SCALE	SOURCE	DESIGN	FILE NO.
-		VGRD	ES-3-4

CONNECT TO TYPICAL MOUNTING HARDWARE
SEE STD. DWG. ES-3-4 FOR SPAN WIRE
ES-1-5 FOR MAST ARM.

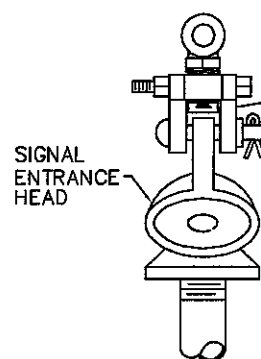


TYP. HORIZONTAL TRAFFIC SIGNAL ARRANGEMENT

NOTE: ALL TRAFFIC SIGNALS ARE
TO BE L.E.D. AND
EQUIPPED WITH TUNNEL VISORS

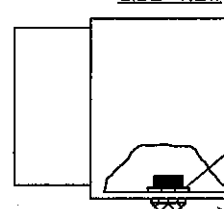


TOP VIEW

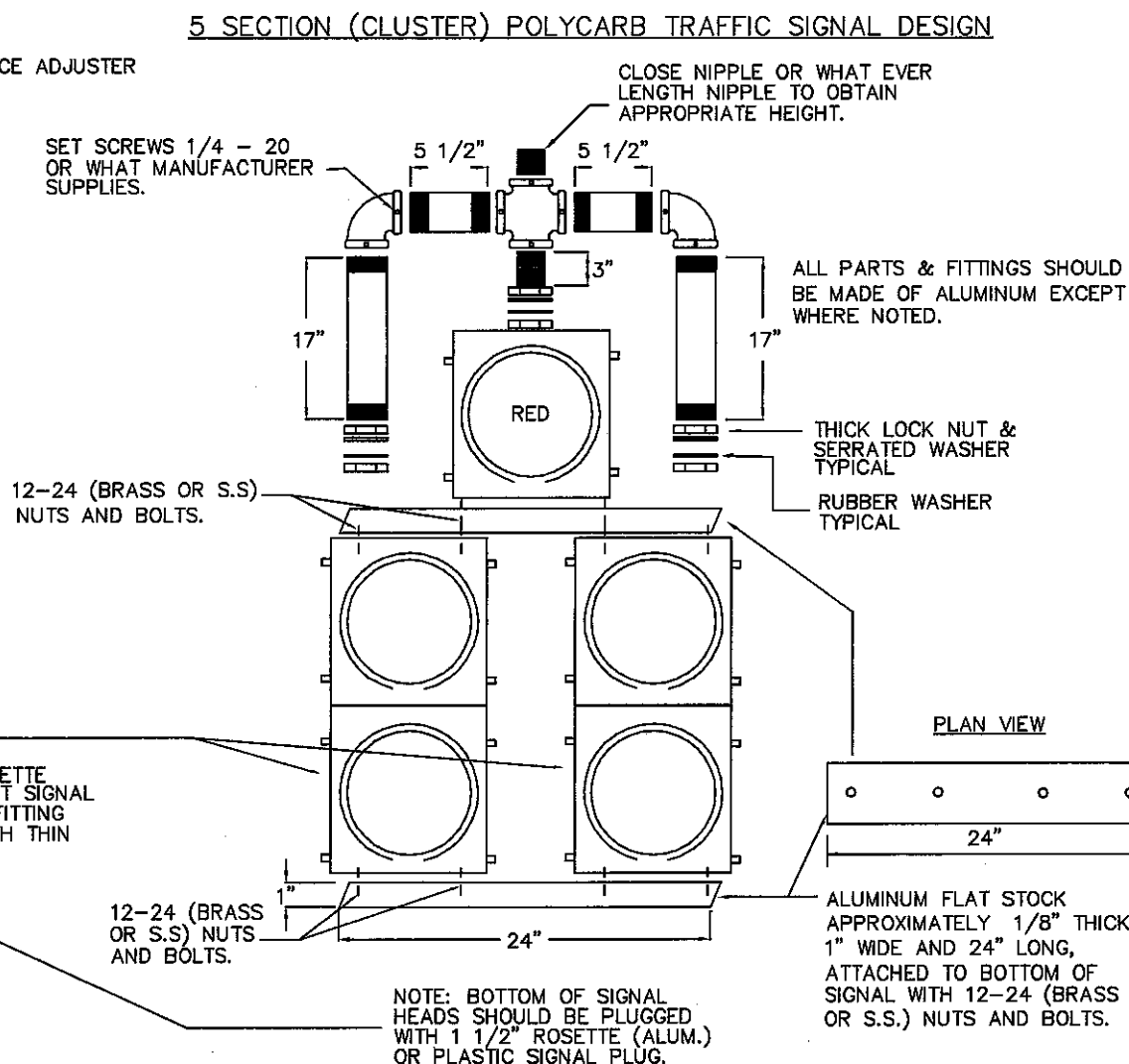


FRONT VIEW OF
BALANCE ADJUSTER &
SIGNAL ENTRANCE HEAD

PARTIAL
SIDE VIEW



INSERT ROSETTE
INTO LOWEST SIGNAL
SECTIONS, FITTING
SECURE WITH THIN
LOCK NUT.

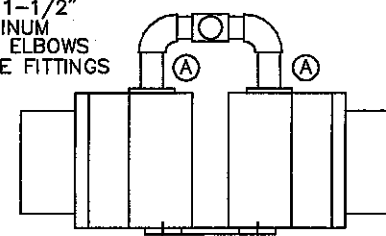


PLAN VIEW

ALUMINUM FLAT STOCK
APPROXIMATELY 1/8" THICK
1" WIDE AND 24" LONG,
ATTACHED TO BOTTOM OF
SIGNAL WITH 12-24 (BRASS
OR S.S.) NUTS AND BOLTS.

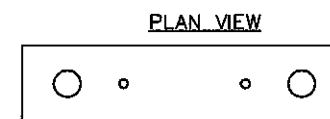
NOTE: BOTTOM OF SIGNAL
HEADS SHOULD BE PLUGGED
WITH 1 1/2" ROSETTE (ALUM.)
OR PLASTIC SIGNAL PLUG.

TYP. 1-1/2"
ALUMINUM
PIPE, ELBOWS
& TEE FITTINGS



SIDE VIEW

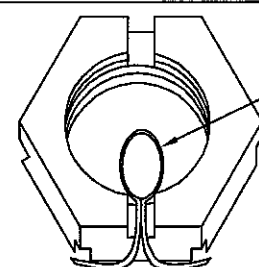
① TYP. DOUBLE SECTION 8" YELLOW
SIGNAL HEAD DETAIL



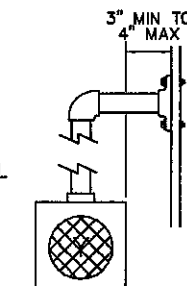
PLAN VIEW

③ 3/16" T. X 2" W. ALUMINUM
PLATE STIFFENER

BOTTOM VIEW COTTER PIN DETAIL



COTTER PIN



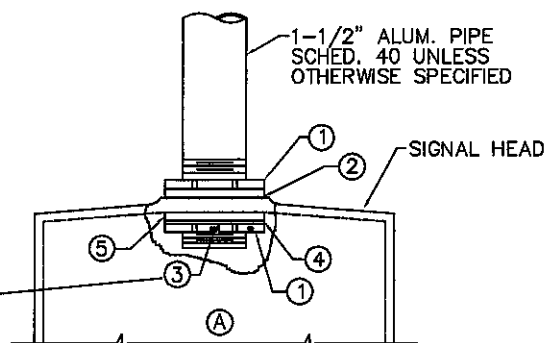
FRONT VIEW

SIGNALS AND OR WARNING SIGN & SIGNALS SHALL BE
INSTALLED WITH 17 FEET OF CLEARANCE TO
PAVEMENT GRADE.

STEEL PIPE & FITTINGS SHALL BE GALV.
SCHED. 40.
ALUM. PIPE & FITTINGS SHALL BE SCHED. 40

ALL HARDWARE FOR SECURING HUBS TO SIGN CABINETS
SHALL BE STAINLESS STEEL NUTS, BOLTS & WASHERS
SIZED TO HUB OPENINGS.

HUBS SHALL BE SIZED TO 1-1/2 INCH PIPE. PROVIDE
ENTRANCE HOLE (1 INCH) FOR WIRE ENTRY INTO
SIGN CABINET. SECURE WEATHERPROOF SEAL OF HUBS
TO SIGNS WITH GASKETS.



NOTES (FOR A & B)

- ① 1-1/2" ALUMINUM OR GALV. MALLEABLE LOCK NUT, (THICK TYPE 3/8" TO 1/2" THICK).
- ② SERRATED BUSHING.
- ③ DRILL HOLE IN NIPPLE WERE SLOT FOR THE NIPPLES OF THE SERRATED WASHER WOULD FIT IN, INSERT COTTER PIN IN HOLE. AS SHOWN ABOVE.
- ④ 1-1/2" STAINLESS STEEL WASHER.
- ⑤ 1-1/2" RUBBER WASHER.
- ⑥ ALL THREADS ON STEEL PIPE ARE TO BE PAINTED WITH A ZINC RICH PRIMER PRIOR TO ASSEMBLY.

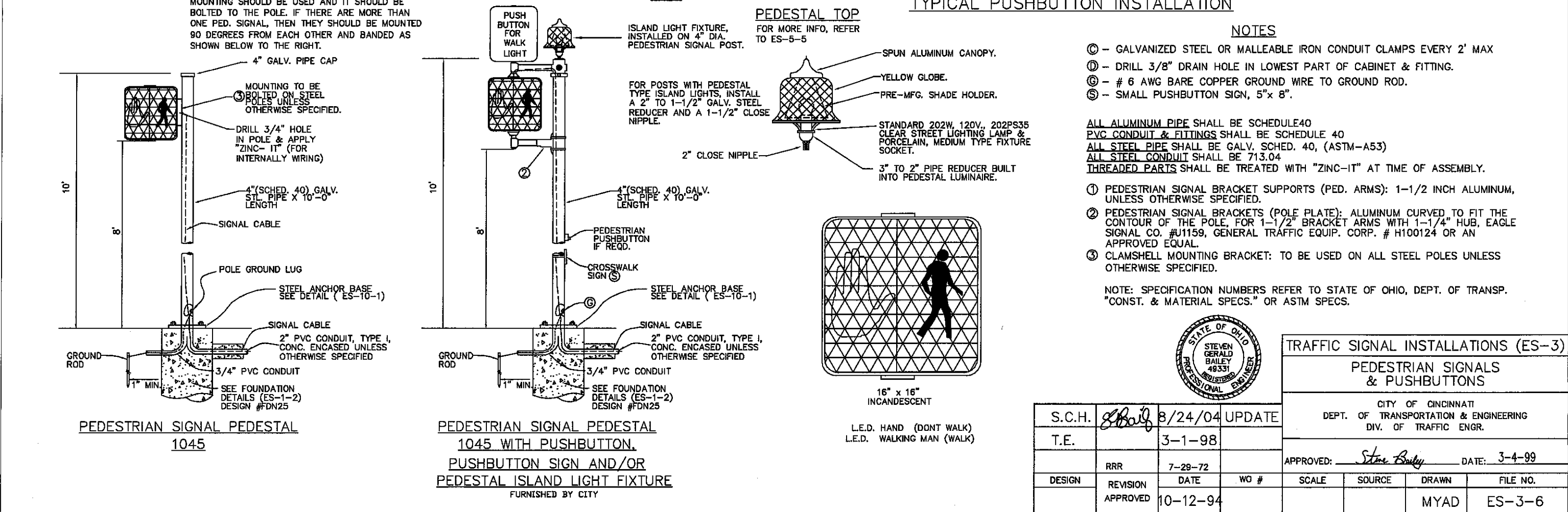
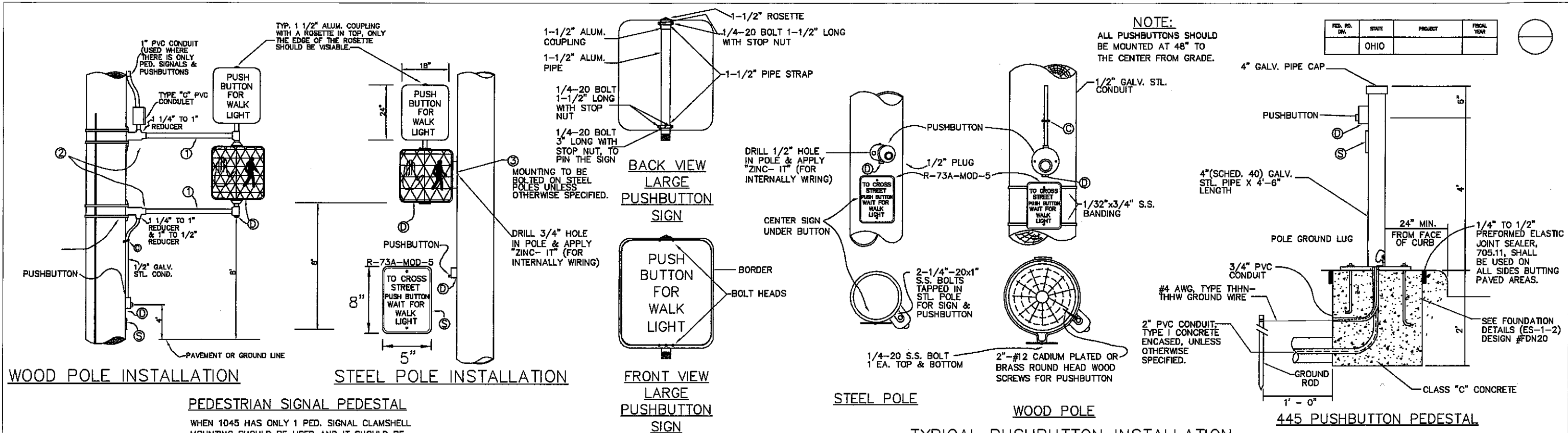
① TYPICAL METHOD OF CONNECTING TRAFFIC SIGNAL HEAD
WITH NIPPLE OR MANUF'D ENTRANCE FITTING

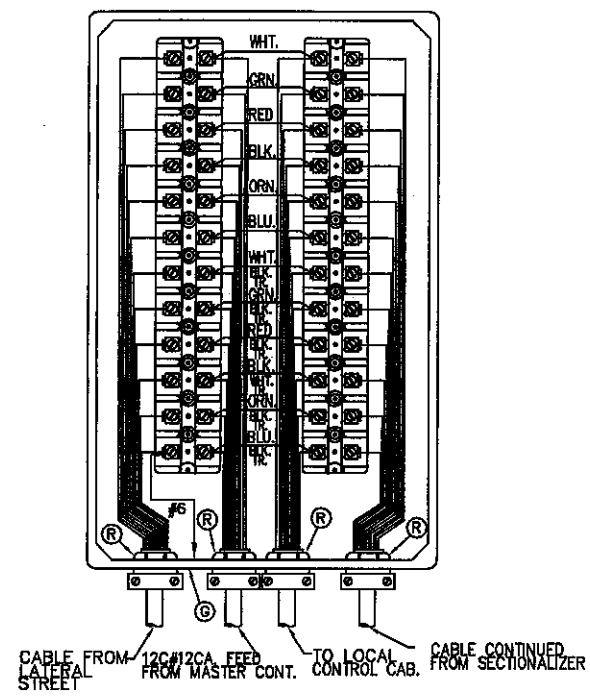


TRAFFIC SIGNAL INSTALLATIONS (ES-3)
SPECIAL TRAFFIC SIGNAL & SIGN
ARRANGEMENT DETAILS

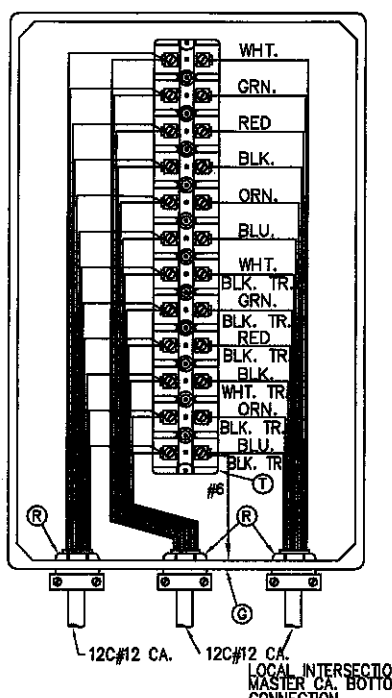
CITY OF CINCINNATI
DEPT. OF TRANSPORTATION & ENGINEERING
DIV. OF TRAFFIC ENGR.

S.C.H.	8/20/04	UPDATE	APPROVED: <i>Steve Bailey</i>	DATE: 3-4-99
T.E.	3/1/98			
DESIGN	REVISION	DATE	WO #	SCALE
R.R.R.	APPROVED	6/26/92		NEW STANDARD
				DRAWN
				CDS ASSOCIATES
				FILE NO.
				ES-3-5

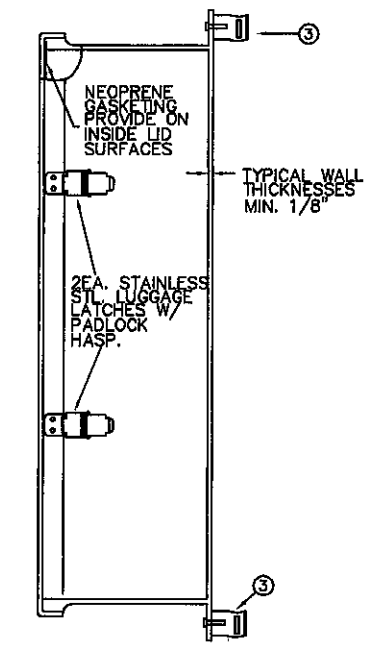




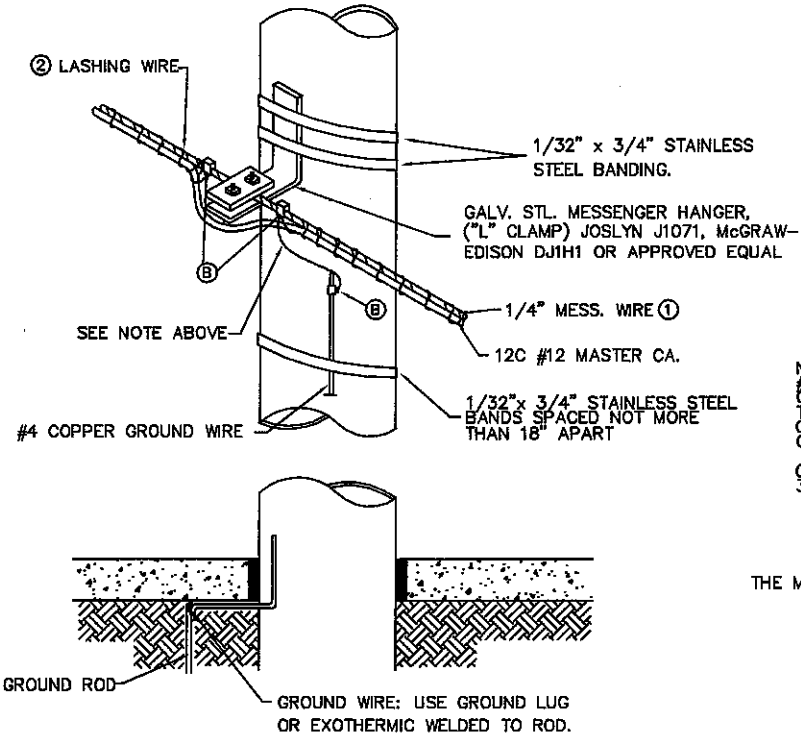
DUPLEX TYPE SECTIONALIZER
(NOT TO SCALE)



STANDARD TYPE SECTIONALIZER
(NOT TO SCALE)

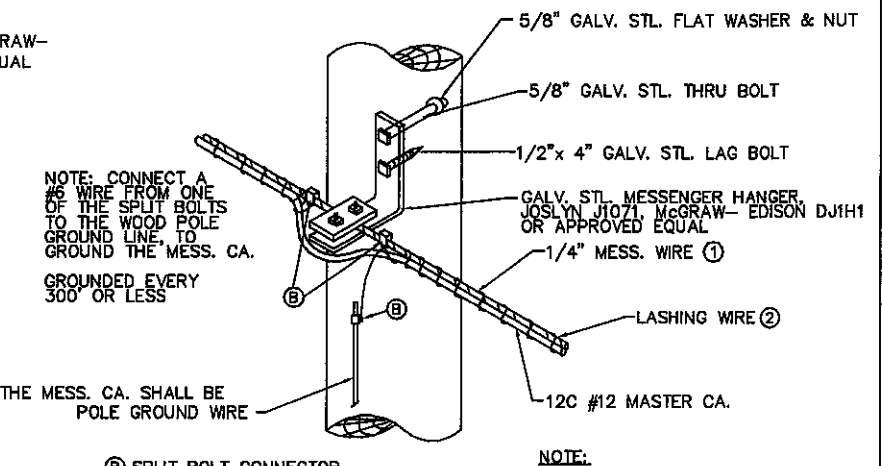


MOUNTING DETAILS
(SIDE VIEW)



STEEL POLE MASTER CABLE HANGER INST.

- ① - 1/4" MESS. CA. (3#9 or 7#12)
- ② - LASHING WIRE - #14 BARE COPPER OR PREFORMED LASHING RODS SECURED TO 1/4" MESS. CA.



WOOD POLE MASTER CABLE HANGER INST.

NOTE: CONNECT A #6 WIRE FROM ONE OF THE SPLIT BOLTS TO THE WOOD POLE GROUND LINE, TO GROUND THE MESS. CA. GROUNDED EVERY 300' OR LESS

③ SPLIT BOLT CONNECTOR DOSSERT, BLACKBURN, MCGRAW-EDISON OR APPVD. EQUAL

NOTE: CABLE SAG BETWEEN POLES SHALL NOT EXCEED 2% OF SPAN LENGTH WHEN WORKING WITH CTCS CABLE THERE IS TO BE NO SAG IN CABLE.

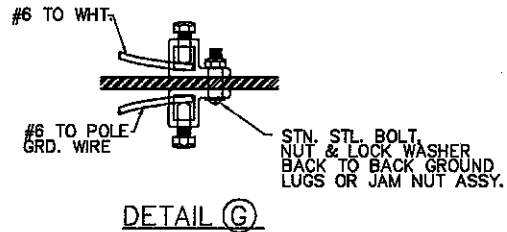
GENERAL NOTES

- TR MEANS SOLID COLOR WIRE WITH TRACER COLOR.
- ALL TERMINAL STRIPS SHALL BE TWELVE(12) POLE AS SHOWN IN DETAIL, SEE DETAIL ①.
- ③ GROUNDING LUGS SHALL BE BLACKBURN L-125; T & B 1300 SERIES; OR APPVD. EQUAL. SEE DETAIL ③ #6 AWG. BARE COPPER GROUNDWIRE; CONNECT FROM GROUND LUG ON CABINET TO POLE GROUND.
- ④ 3/4" ROMEX CONNERTOR.

CABINET FOR THE STANDARD AND FOR THE DUPLEX TYPE SECTIONALIZER SHALL BE NOMINAL 10" WIDE, 12" HIGH & 5" DEEP, EXCLUDING MOUNTING FLANGE. CABINET SHALL BE MADE OF 1/8" (MIN.) MOLDED FIBERGLASS NOT SUPPORTING COMBUSTION OR HEAT DISTORTION TO 350° F AND WITH A RATED MINIMUM TENSILE STRENGTH OF 8,000 PSI COMPRESSION STRENGTH OF 24,000 PSI FLEX STRENGTH OF 18,000 PSI

CABINET SHALL BE WATERPROOF & RAINIGHT, MEETING REQUIREMENTS OF NEMA TYPE 3R, AND SHALL BE EQUIPPED WITH A STAINLESS STEEL PIANO HINGE AT LEAST 8" LONG AND LUGGAGE LATCHES W/PADLOCK HASP. STAHLIN DIV. OF ROBROY INDUST. CAT. #J1210H SSL OR APPROVED EQUAL.

MASTER CABLE SHALL BE WIRED INTO EXISTING MASTER SYSTEMS ONLY UNDER SUPERVISION OF CITY MAINTENANCE PERSONNEL.



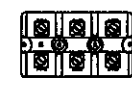
MASTER CABLE WIRING SCHEDULE

CONDUCTORS	CONDUCTOR COLOR	CBD AREA	FUNCTIONS	REVERSIBLE LANE SYS.
1	WHITE	COMMON	COMMON	COMMON
2	BLACK	CODE D FLASH	CODE D FLASH	CODE D FLASH
3	RED	OFFSET 1 IMPULSE	OFFSET 1 IMPULSE	OFFSET 1 IMPULSE
4	GREEN	DIAL 2 TRANSFER	DIAL 2 TRANSFER	DIAL 2 TRANSFER
5	BLUE	OFFSET 2 IMPULSE	OFFSET 2 IMPULSE	OFFSET 2 IMPULSE
6	ORANGE	CODE B FLASH	CODE B FLASH	CODE B FLASH
7	WHITE BLACK TR.	SPLIT 2	SPLIT 2	SPLIT 2
8	WHITE BLACK TR.	SPLIT 3	SPLIT 3	SPLIT 3
9	RED BLACK TR.	OFFSET 2 IMPULSE	OFFSET 2 IMPULSE	OFFSET 2 IMPULSE
10	GREEN BLACK TR.	DIAL 3 TRANSFER	DIAL 3 TRANSFER	DIAL 3 TRANSFER
11	BLUE BLACK TR.	R 60 IMPULSE	R 60 IMPULSE	INBOUND GREEN ARROW
12	ORANGE BLACK TR.	EV FLASH	CODE C FLASH	OUTBOUND GREEN ARROW

ALL TERMINAL SCREWS, LUGS, PLATES, NUTS & WASHERS SHALL BE OF SILICON BRONZE, NICKEL OR CADMIUM - PLATED STEEL OR BRASS OR APPVD. EQUAL NON CORROSIVE MATERIAL.

ALL INSULATING BARRIERS & FRAME SHALL BE MOLDED PHENOLIC, PORCELAIN, BAKELITE, NYLON OR APPVD. HIGH QUALITY INSULATING MATERIAL RATED FOR 600 VOLT SERVICE (MIN.)

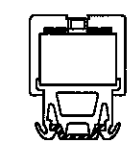
TERMINALS SHALL BE THE TUBULAR SCREW TYPE RATED FOR MIN. 30 AMP. SERVICE AND SIZED FOR 1 - #14 TO #4 WIRE (MIN.) ALLEN - BRADLEY BULLETIN 1492, SQUARE D TYPE KD-1, BUCHANON TYPE 416 OR APPROVED EQUAL.



PLAN VIEW



SIDE VIEW



END VIEW

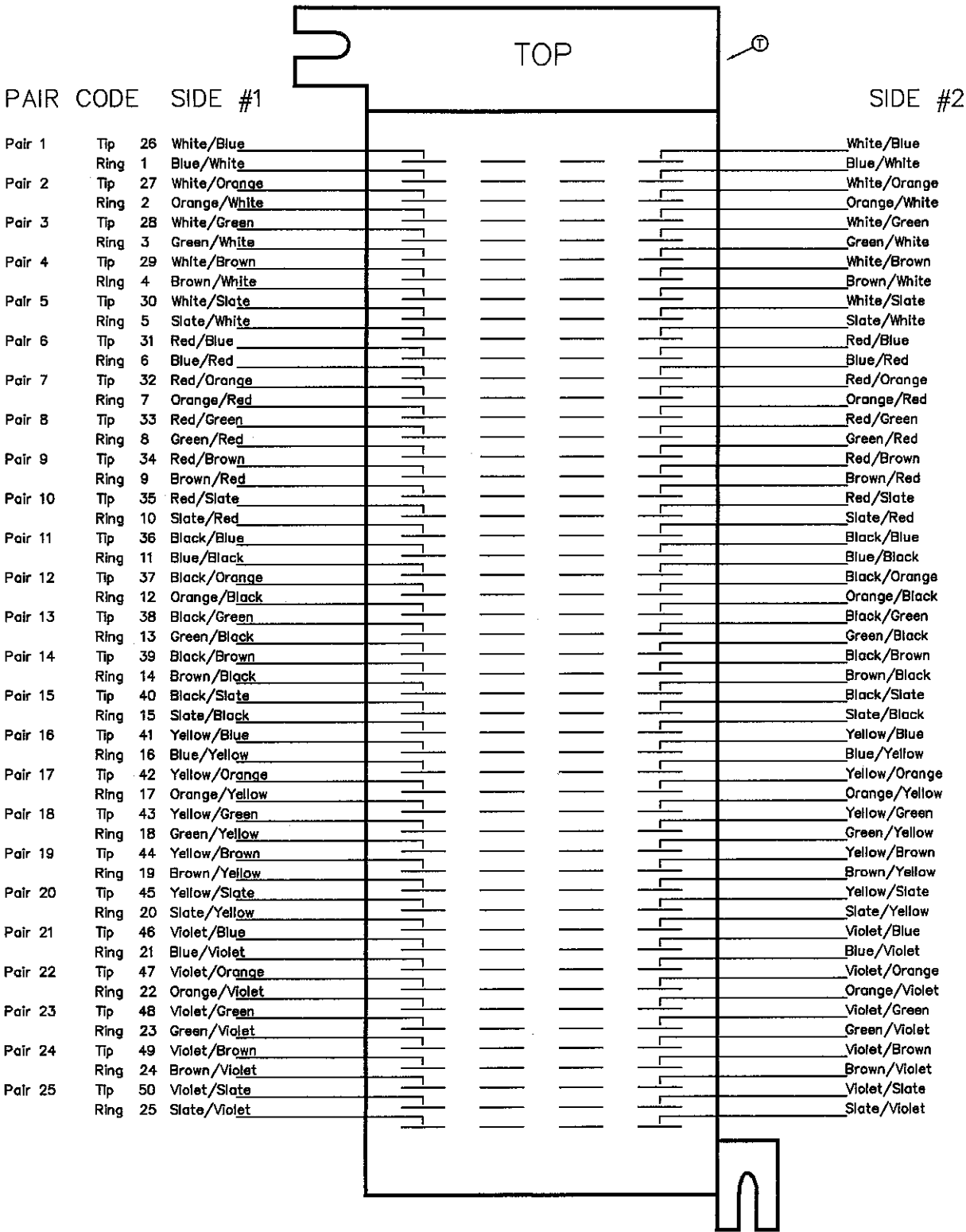
DETAIL ①



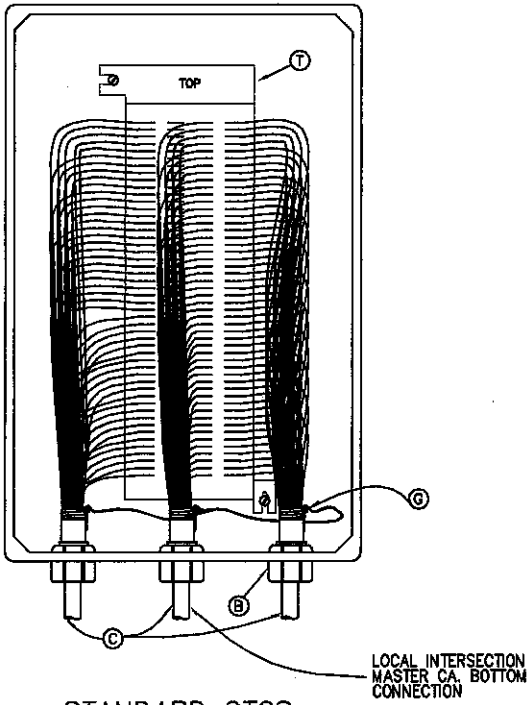
TRAFFIC SIGNAL INSTALLATIONS (ES-3)
INTERCONNECTING CABLE & SECTIONALIZER INSTALLATION FOR THE 120 VOLT SYSTEM

CITY OF CINCINNATI
DEPT. OF TRANSPORTATION & ENGINEERING
DIV. OF TRAFFIC ENGR.

DESIGN	REVISION	DATE	WD #	SCALE	SOURCE	DRAWN	FILE NO.
S.C.H.	Ed Bailey	8/27/04	UPDATE	NONE		VGRD	ES-3-7A
APPROVED		9/14/94					



CENTER CABLE OMITTED WHEN ONLY TWO CABLES ARE CONNECTED.



STANDARD CTCS
TYPE SECTIONALIZER

GENERAL NOTES

- ⑧ STRAIN RELIEF CORD CONNECTOR, STRAIGHT, THOMAS & BETTS OR EQUIVALENT FOR UNDERGROUND LOCATIONS USE SEALING HUB, THOMAS & BETTS #H075-TB OR EQUIVALENT.
- ⑨ CTCS CABLE SHALL BE TWISTED PAIR, SHIELDED COMMUNICATIONS CABLE # 24 AWG, UNLESS OTHERWISE SPECIFIED. CABLE SHALL MEET REA SPECIFICATION PE-89, TYPE BJFC AND SHALL BE PETROLATUM FILLED. SHIELDING SHALL BE 0.005 INCH OR 0.01 INCH GOPHER RESISTANT, WHERE SPECIFIED, SOLID COPPER TAPE SHIELD WITH OVERLAP TO PROVIDE 100% ELECTRICAL SHIELDING COVERAGE.
- ⑩ SCHOTCH LOK #4450 SHIELD CONNECTOR OR EQUIVALENT AND # 14 AWG COPPER BONDING JUMPER.
- ⑪ SIEMENS 66 TERMINAL BLOCK, SIEMENS #S66M1-50, BRACKET #S89B

CABINET FOR THE STANDARD AND FOR THE DUPLEX TYPE SECTIONALIZER SHALL BE NOMINAL 10" WIDE, 12" HIGH & 5" DEEP, EXCLUDING MOUNTING FLANGE. CABINET SHALL BE MADE OF 1/8" (MIN.) MOLDED FIBERGLASS NOT SUPPORTING COMBUSTION OR HEAT DISTORTION TO 350° F AND WITH A RATED MINIMUM TENSILE STRENGTH OF 8,000 PSI COMPRESSION STRENGTH OF 24,000 PSI FLEX STRENGTH OF 18,000 PSI

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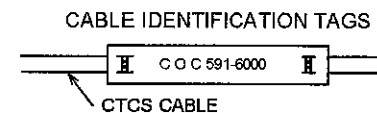


TRAFFIC SIGNAL INSTALLATIONS (ES-3)
INTERCONNECTING CABLE
& SECTIONALIZER INSTALLATION
FOR CTCS SYSTEM

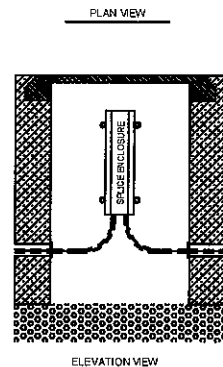
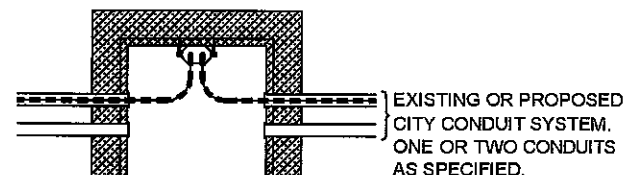
CITY OF CINCINNATI
DEPT. OF TRANSPORTATION & ENGINEERING
DIV. OF TRAFFIC ENGR.

APPROVED: *Steve Bailey* DATE: 3-4-99

DESIGN	REVISION	DATE	NO.	SCALE	SOURCE	DRAWN	FILE NO.
JEW	APPROVED	2/11/99		NONE		JEW	ES-3-7B



TAGS SHALL BE WEATHERPROOF PLASTIC WITH INDELIBLE, IMPRINTED TEXT AS SHOWN. THEY SHALL BE A MINIMUM OF 4" LONG. TAGS SHALL BE ZIP TIED TO CTCS CABLE AT EVERY POLE ATTACHMENT AND PULLBOX ENTRY.



CONTRACTOR TO TERMINATE 6-PAIR CABLE ON RCU/TBC INTERFACE PANEL WHERE SIZE OF EXISTING CONTROLLER CABINET PERMITS PANEL INSTALLATION.

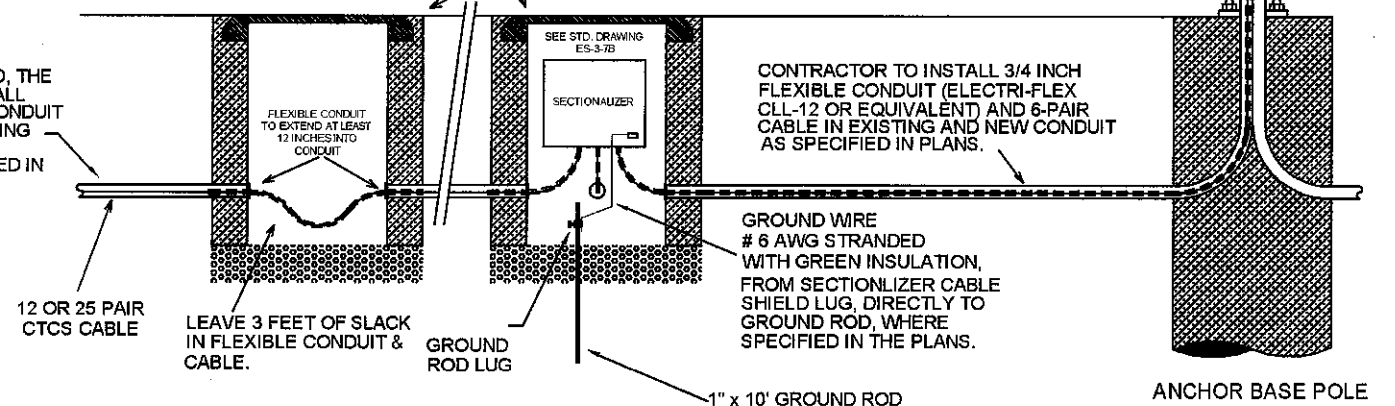
TYPICAL DETAIL OF SPLICE ENCLOSURE IN CITY CONDUIT SYSTEM WHERE CONTRACTOR IS SPECIFIED TO SPLICE MULTI PAIR CABLE. WHERE SPACE PERMITS, SECURE ENCLOSURE TO PULLBOX WALL WITH GALVANIZED, OR STAINLESS STEEL SCREW ANCHORS AND SPACERS.

PULLBOXES

REFER TO STANDARD DRAWING ES-2-1 FOR INSTALLATION OF PULLBOXES IN OTHER AREAS.

NEW OR EXISTING PULLBOX AS SPECIFIED IN THE PLANS. (FLEXIBLE CONDUIT AND CABLE MAY PASS THROUGH MORE THAN ONE EXISTING PULLBOX)

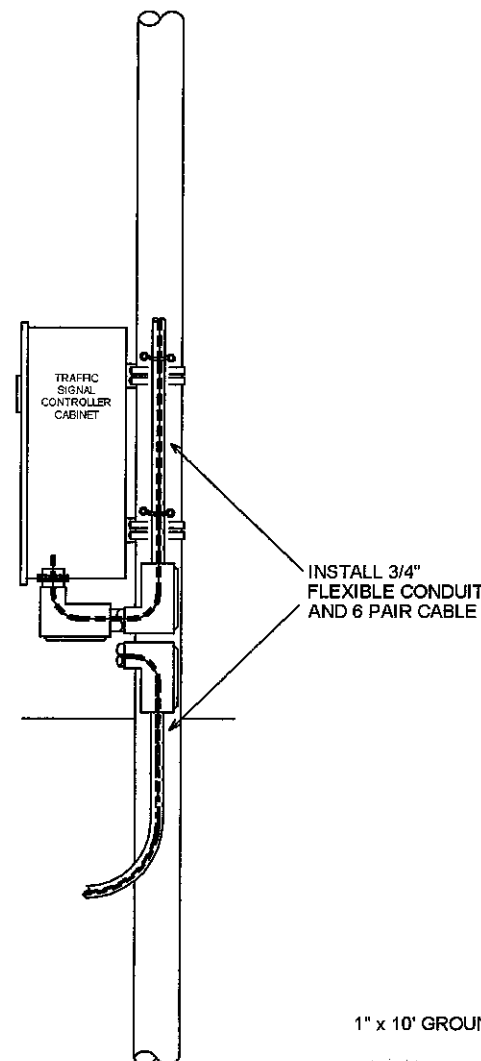
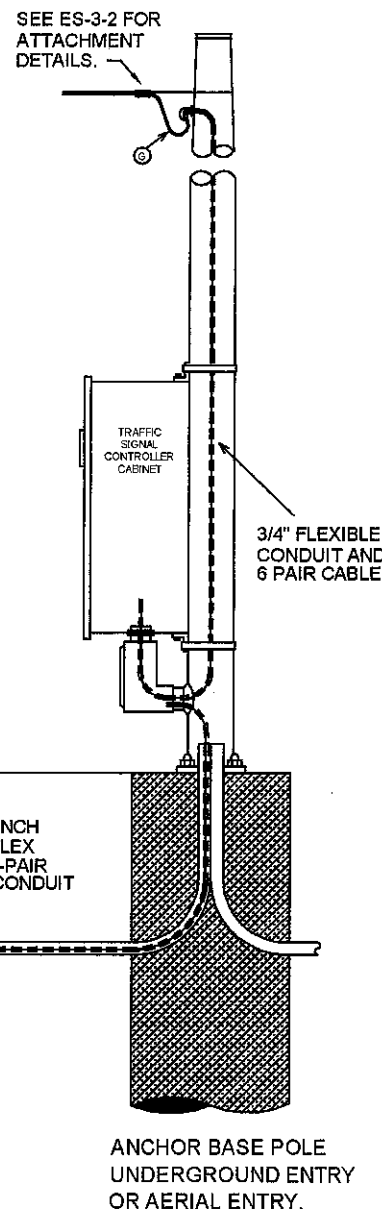
WHERE SPECIFIED, THE CONTRACTOR SHALL INSTALL 3-INCH CONDUIT OR EXTEND EXISTING CONDUITS TO THE PULLBOX SPECIFIED IN THE PLANS.



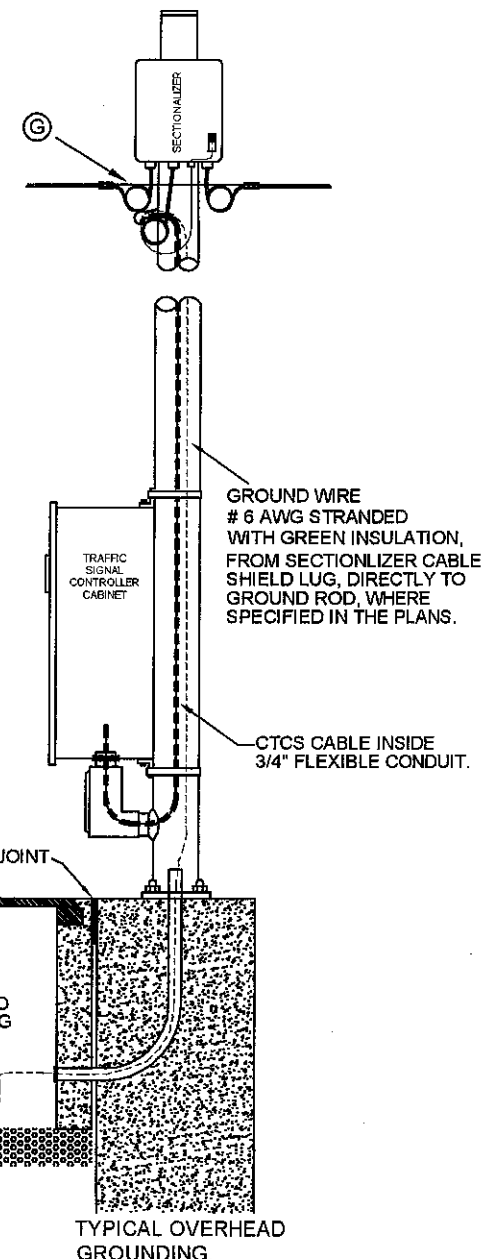
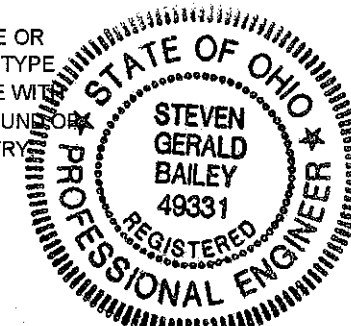
UNDERGROUND COMMUNICATION CABLE ACCESS TO CONTROLLER CABINET

ALL CTCS CABLES SHALL BE IDENTIFIED IN PULLBOXES WITH WEATHERPROOF PLASTIC TAGS DETAILED ABOVE AND ZIP TIED TO THE CABLE.

Ⓒ ALL SPANS SHOULD BE BOND TO EACH OTHER AND GROUNDED TO THE POLE GROUND WITH A SOLID #6 BARE COPPER GROUND WIRE. (DO NOT CONNECT TO THE SHIELD OF THE CTCS CABLE)



WOOD POLE OR EMBEDDED TYPE STEEL POLE WITH UNDERGROUND OR AERIAL ENTRY



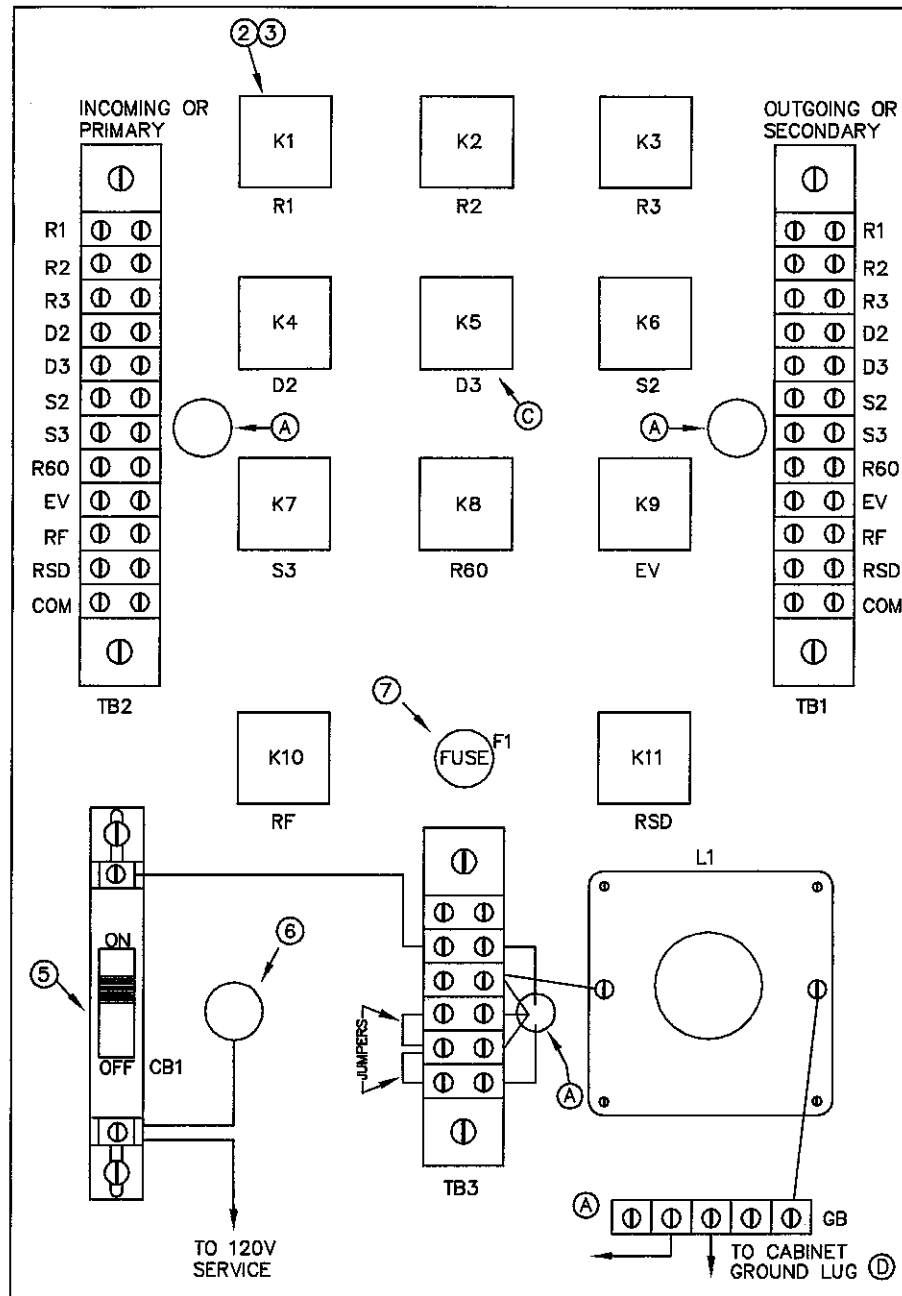
TRAFFIC SIGNAL INSTALLATION (ES-3)

CTCS SYSTEM FROM CINTI. BELL MANHOLE TO CITY PULLBOX

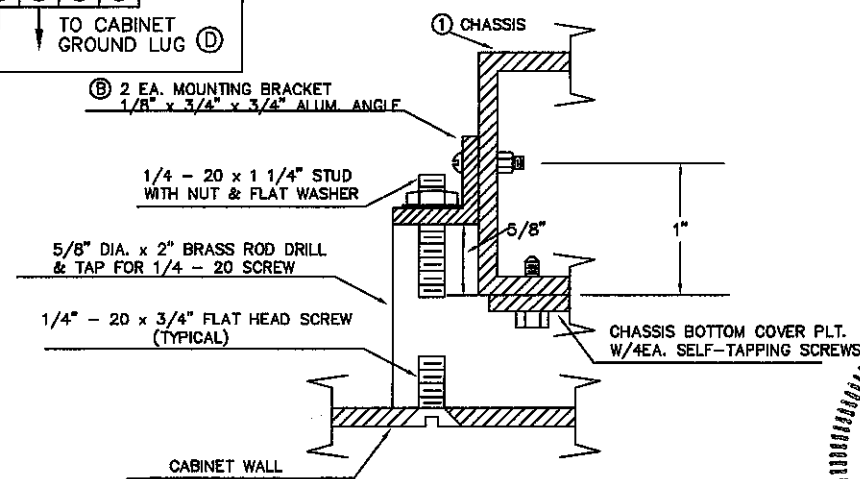
CITY OF CINCINNATI
DEPT. OF TRANSPORTATION AND ENGINEERING
DIV. OF TRAFFIC ENGINEERING

APPROVED *St. Bailey* DATE 4-27-2005

S.C.H.	<i>St. Bailey</i>	2/3/05	UPDATE	APPROVED	SCALE	SOURCE	DRAWN	FILE NO.
DESIGN	REVISION	DATE	W.O.#					
MK	APPROVED	11/1/94		NONE			PWM	ES-3-7C



PANEL LAYOUT (SURFACE)



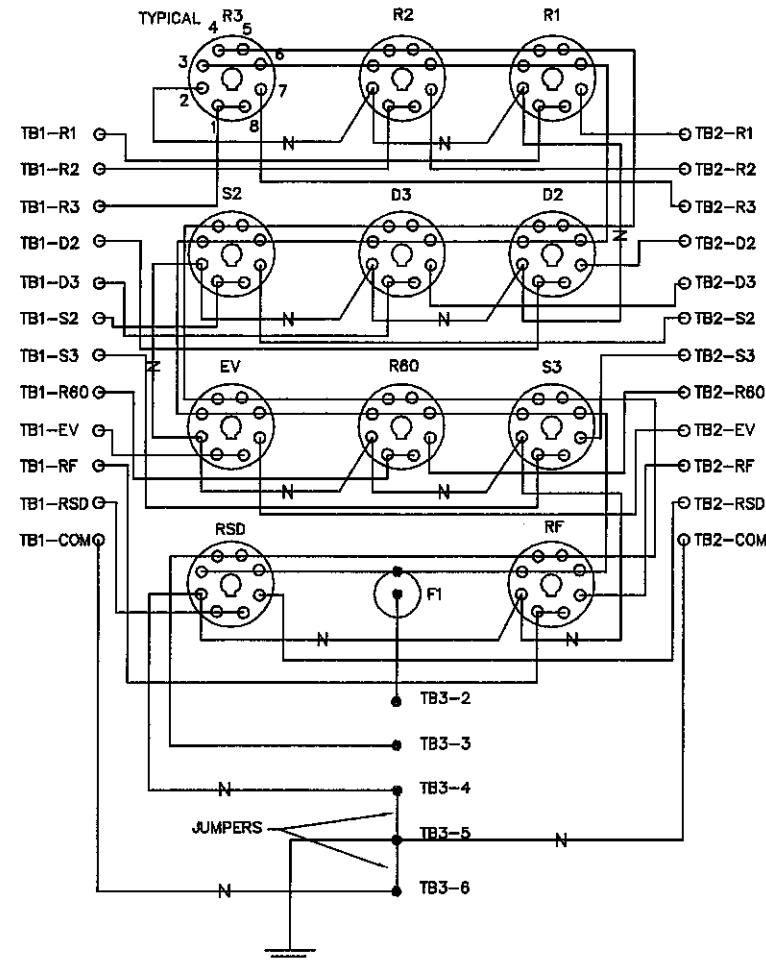
TYPICAL SECTION -
MOUNTING CHASSIS TO CABINET

LIST OF MATERIALS

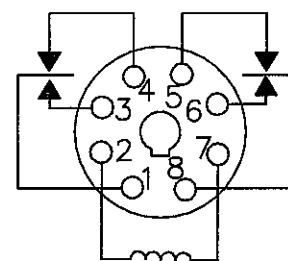
PART NO.	QUANTITY	DESIGN	DESCRIPTION
①	1		CHASSIS 11" WIDE, 17" LONG, 2" DEEP, 18 GA. STL. ZINC PLATED FINISH.
②	11	K1-K11	RELAYS: DPDT, 10 AMP. CONTINUOUS DUTY RATED. POTTER-BRUMFIELD KRP-11AG ESSEX (RBM) 93P908, MAGNECRAFT N88 ACPX.*
③	11	K1-K11	RELAY SOCKET 8 PIN KEYED OCTAL OF HIGH DIELECTRIC PHENOLIC. AMPHENOL. CINCH*
④	3	TB1, TB2, TB3	TERMINAL STRIPS: 600 VOLT BARRIER TYPE, 30 AMP. TUBULAR SCREW TYPE POLES WITH PRESSURE PLATES.
⑤	1	CB-1	15 AMP. MAGNETIC TRIP TYPE CIRCUIT BREAKER (SURFACE MOUNTED ON CHASSIS). SQUARE D, QO SERIES, CUTLER-HAMMER CH*
⑥	1	A1	LIGHTING ARRESTOR JOSLYN # J9200-3 *
⑦	1	F1	FUSE & HOLDER SLO-BLO, DUAL ELEMENT GLASS TUBE TYPE WITH EXTRACTOR (PANEL MTD.) TYPE HOLDER. BUSS MDX-5 LITTLEFUSE 3 AG 313005
⑧	1	L1	69 WATT TRAFFIC SIGNAL LAMP WITH PORCELAIN CLEAT TYPE RECEPTACLE. HUBBLE, KNOX *
⑨	1	G3	5 POLE SILICONE-BRONZE OR BRASS GROUNDING BUSS ILSCO D167 CUTLER-HAMMER CH9G5*

NOTES

- DRILL WIRE FEED-THRU HOLES, DEBURR AND PROVIDE RUBBER GROMMETS.
 - CHASSIS MOUNTING BRACKET. SEE DETAIL.
 - LABEL EACH TERMINAL & RELAY WITH PERMANENT MARKING OR LABELING. LABELING FOR TERMINALS MAY BE ON THE TERMINALS, OR AS SHOWN.
 - PROVIDE GROUND LUG ILSCO # 6T-6 OR BLACKBURN # L-70* ON CABINET INSIDE BOTTOM FOR EQUIPMENT GROUND, CHASSIS GROUND & FEED TO DRIVEN GROUND.
- SOLDER GROUND BUSS "GB" TO CHASSIS AT THE MOUNTING NUT INSIDE THE CHASSIS.



WIRING DIAGRAM

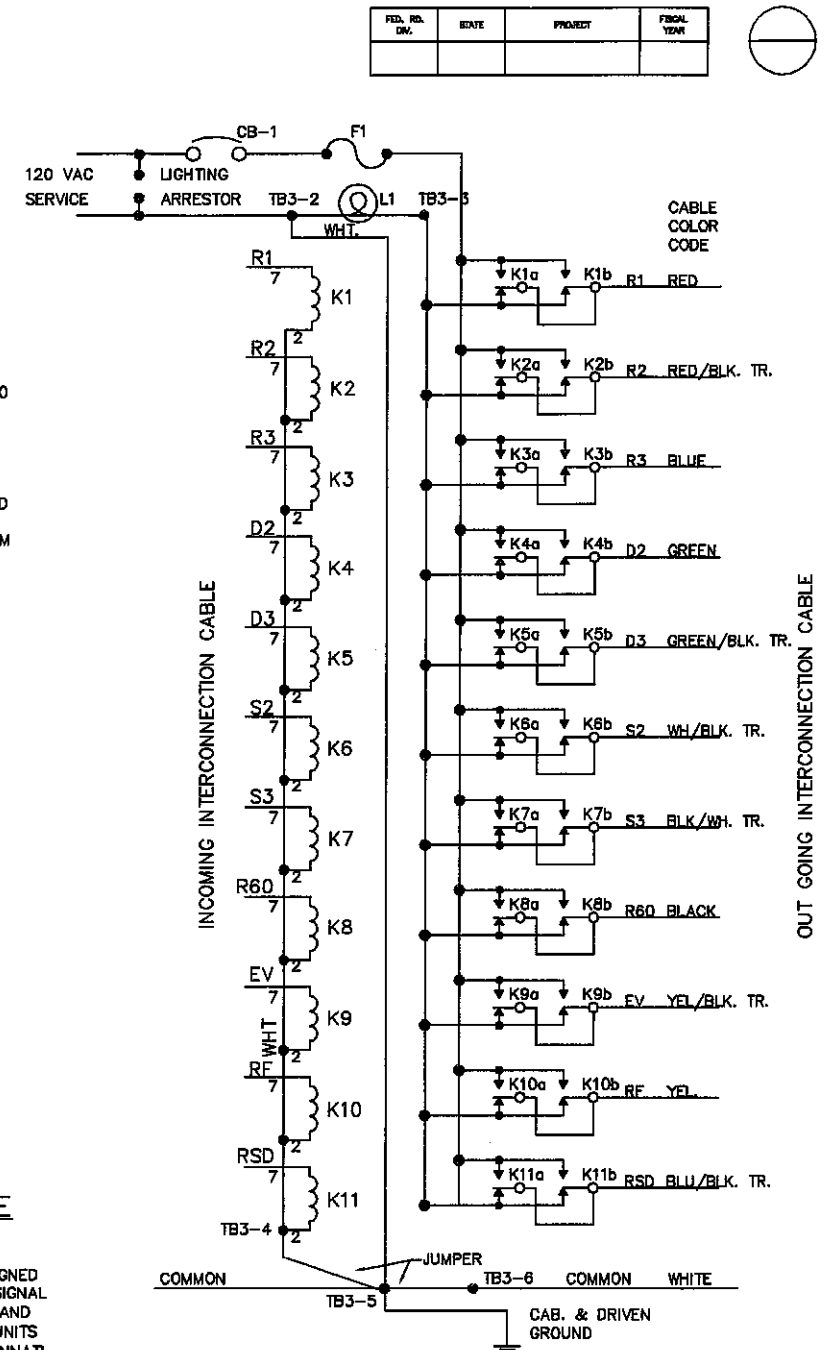


TYPICAL RELAY SOCKET KEY

GENERAL NOTE

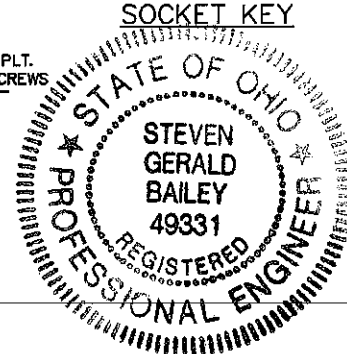
THE RELAY STATION IS DESIGNED PRINCIPALLY FOR TRAFFIC SIGNAL INTERCONNECTING SYSTEMS AND IS INTERCHANGEABLE WITH UNITS USED BY THE CITY OF CINCINNATI.

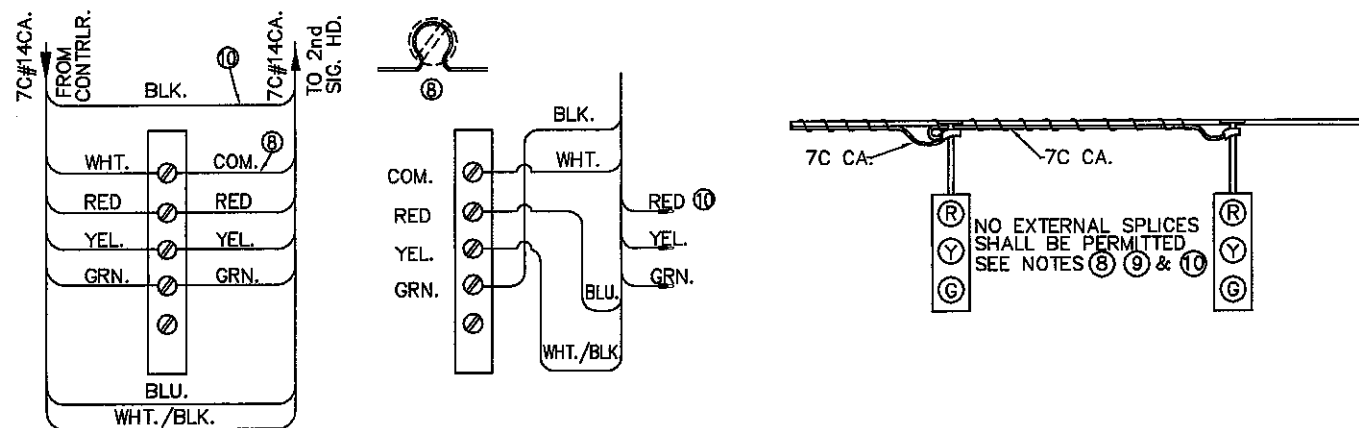
THE RELAY STATION MAY BE ADAPTED TO OTHER SYSTEMS BY UTILIZING THE CONDUCTOR COLOR CODE AND DISREGARDING THE LABELED DESIGNATIONS.



SCHEMATIC DIAGRAM

TRAFFIC SIGNAL INSTALLATIONS (ES-3)							
RELAY STATION WIRING DIAGRAM							
CITY OF CINCINNATI DEPT. OF TRANSPORTATION & ENGINEERING DIV. OF TRAFFIC ENGR.							
APPROVED <i>Steven Gerald Bailey</i>				DATE 4-27-2005			
DESIGN	REVISION	DATE	NO.	SCALE	SOURCE	DRIVEN	FILE NO.
	APPROVED	8/30/04		-		S.C.H.	ES-3-8





1st. SIGNAL HEAD 2nd. SIGNAL HEAD
THE 7C CA. SHALL BE ROUTED IN & OUT OF FIRST SIGNAL HEAD IN THIS CASE, EACH SIGNAL HEAD SHALL BE FURNISHED WITH A 5 POLE WIRING TERMINAL. SEE NOTES ⑧, ⑨ & ⑩ FOR WIRING CONNECTIONS.

WIRING DETAIL

NOTES

ALL TRAFFIC SIGNAL CABLE SHALL BE SOLID OR STRANDED COPPER CONDUCTORS AND SHALL BE RATED 600V.- ISMA SPEC.19-1 OR 20-1, UNLESS OTHERWISE SPECIFIED ALL CABLES SHALL BE ROUTED FROM THE CONTROLLER, DIRECTLY TO THE DEVICE. (HOME RUN) EXCEPTIONS:

NOTE ① WHERE (2) TWO VEHICLE SIGNALS ARE CONNECTED TO ONE (1) 7C#14 CA, THIS REFERS TO 2 SIGNALS ON THE SAME MESS. CA., OR MAST ARM, AND WHICH SERVICE THE SAME APPROACH OR PHASE. REFER TO WIRING DETAIL THIS SHEET.

NOTE ② CONNECT GREEN CONDUCTOR TO ARROW WHERE ARROW IS USED INSTEAD OF GREEN LENS (TYP.)

NOTE ③ WHEN WIRING ILLUMINATED OVERHEAD SIGNS, USE 1-2C#12 CA. & CONNECT IN PARALLEL AS MANY AS 4 OR 5 SIGNS, SO LONG AS THE VOLTAGE DROP IS WITHIN 5%. SEE CHART.

NOTE ④ DETECTOR LEAD-IN CABLE SHALL BE CONNECTED FROM LOOP TO AMPLIFIER AND SHALL BE 2C#14 SHIELDED (19x 27 STRANDING). CONNECT SHIELD AT AMPLIFIER CABINET GROUND ONLY.

NOTE ⑤ CABLE CONNECTING SIGNAL HEAD TO CONTROL STATION CABINET.

NOTE ⑥ POWER & SERVICE CONDUCTORS NORMALLY #6 BUT MAY BE SPECIFIED LARGER. CONDUCTOR SHALL BE 600 VOLT, RHH/RHW/USE INSULATED.

NOTE ⑦ AUDIBLE DEVICE FOR BLIND PEDESTRIANS. PROVIDE CONDUCTORS FOR PROPOSED OR FUTURE DEVICES. CONNECT WALK DEVICE TO WALK SIGNAL CONDUCTOR. PROVIDE SEPARATE CONDUCTOR TO CONTROLLER FOR FLASHING DONT WALK DEVICE.

NOTE ⑧ TYPICAL METHODS FOR CONNECTING TO TERMINAL STRIP.

- 1) REMOVE INSULATION FROM. APPROX. 1" OF CONDUCTOR AND LOOP AROUND TERMINAL OR
- 2) CONNECT BOTH CONDUCTORS OF SAME COLOR TO A RING TONGUE OR FORKED TONGUE LUG.

NOTE ⑨ TYPICAL METHOD FOR DEAD-END CONDUCTOR W/NO TERMINAL CONNECTION.

- 1) USE INSULATED SPLICE BUTT TYPE CONNECTOR. T & B 2 RB-14, BURNDY #SN-14, 3M CO. "INSULINK" OR APPROVED EQUAL. OR
- 2) TAPE BACK CONDUCTOR END.

NOTE ⑩ TYPICAL METHOD FOR CONTINUING CONDUCTOR THRU SIGNAL HEAD W/O TERMINAL CONNECTION.

- 1) MAINTAIN UNUSED CONDUCTOR IN AND OUT OF SIGNAL HEAD W/O CUTTING OR SPLICING. OR
- 2) SPLICE UNUSED CONDUCTORS W/INSULATED SPLICE BUTT CONNECTORS. SEE NOTE ⑨ FOR CONNECTOR TYP.

NOTE ⑪ 3#14 CABLES NORMALLY USED WHERE PHOTOCELL CONTROLS CONTACTOR COIL ONLY. WHERE PHOTOCELL USED TO PROVIDE DIRECT SERVICE FEED, USE 3C#12.

NUMBER OF CONDUCTORS	CONDUCTOR COLOR CODE	VEHICLE SIGNALS			PEDESTRIAN SIGNALS	REVERSIBLE LANE CONTROL SIGNAL	PHOTO ELECTRIC CELL (FOR ISLAND LIGHTING)	WARNING SIGNALS	DETECTORS NOTE ④	SERVICE	OTHERS
		1-3 OR 4 SECTION TRAFFIC SIGNAL HEADS	2-3 SECTION TRAFFIC SIGNAL HEADS SEE NOTE ①	1-5 SECTION TRAFFIC SIGNAL HEADS	1 PED. SIGNAL W/AUDIBLE DEVICE INCL. PUSHBUTTON			EMERGENCY VEHICLE ADVANCE WARNING OR FLASHING SIGNAL	LOOP OR MAGNETIC AMPLIFIER LOCATED REMOTE FROM CONTROLLER		ILLUMINATED SIGNS PUSHBUTTONS SINGLE UNIT SIGNAL HEADS. ISLAND LIGHTING
1	BLK.	1ST ARROW SIGNAL (OR SPARE)	GRN. SIGNAL (2ND HEAD) & SPARE (1ST HEAD)	GREEN ARROW	SPARE	GREEN ARROW (IN BOUND)	120V. SERVICE	SIGN OR SPARE	120V. SERVICE	120V. SERVICE OR 240V. ST. LIGHT SERVICE	120V. OR ENERGIZED LINE
2	WHT.	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON	COMMON
3	RED	RED SIGNAL	RED SIGNAL (1ST HEAD)	RED SIGNAL	DONT WALK	RED X (OUT BOUND)	120V. CONTROL. LINE FROM CELL TO LIGHTING CONTRACTOR	FLASH SIGNAL	DETECTOR TERMINAL CHANNEL 1	240V. ST. LIGHT SERVICE	
4	GRN.	GRN. SIGNAL NOTE ②	GRN. SIGNAL (1ST HEAD)	GRN. SIGNAL	WALK ⑦	GREEN ARROW (OUT BOUND)			DETECTOR TERMINAL CHANNEL 2	EQUIPMENT GROUND REQUIRED FOR 240V. CKTS.	
5	YEL. (OR ORN.)	YELLOW SIGNAL	YELLOW SIGNAL (1ST HEAD)	YELLOW SIGNAL	AUDIBLE DEVICE (FLDW) ⑦	RED X (IN BOUND)		ALTERNATE FLASHING SIGNAL (OR SPARE)	DETECTOR TERMINAL CHANNEL 3		
6	BLU		RED SIGNAL (2ND HEAD)		PUSHBUTTON				DETECTOR TERMINAL CHANNEL 4		
7	WHT. BLK.-TR.		YELLOW SIGNAL (2ND HEAD)	YELLOW ARROW	PUSHBUTTON				SPARE		
CABLE REQUIREMENTS		1-7C#14CA.	1-7C#14CA.	1-7C#14CA.	1-7C#14CA.	1-7C#14CA.	1-3C#14CA. ⑪	1-7C#14CA.	1-7C#14CA.	2-#6CA. OR ⑥ 3-#6CA.	1-2C#12CA. (ISLE LIGHTING CIRCUIT)

ILLUMINATED SIGNS

NO. OF SIGNS	ALLOWABLE MAX. LENGTH OF 2C#12 FROM CONTRLR. TO SIGNS
2	1000'
3	750'
4	450'
5	350'

S.C.H.	8/30/04	UPDATE	
T.E.	3/1/98		
DESIGN	REVISION	DATE	NO. #
	APPROVED	11/21/94	
SCALE	SOURCE	DRAWN	FILE NO.
-		VGRD	ES-3-9



TRAFFIC SIGNAL INSTALLATIONS (ES-3)

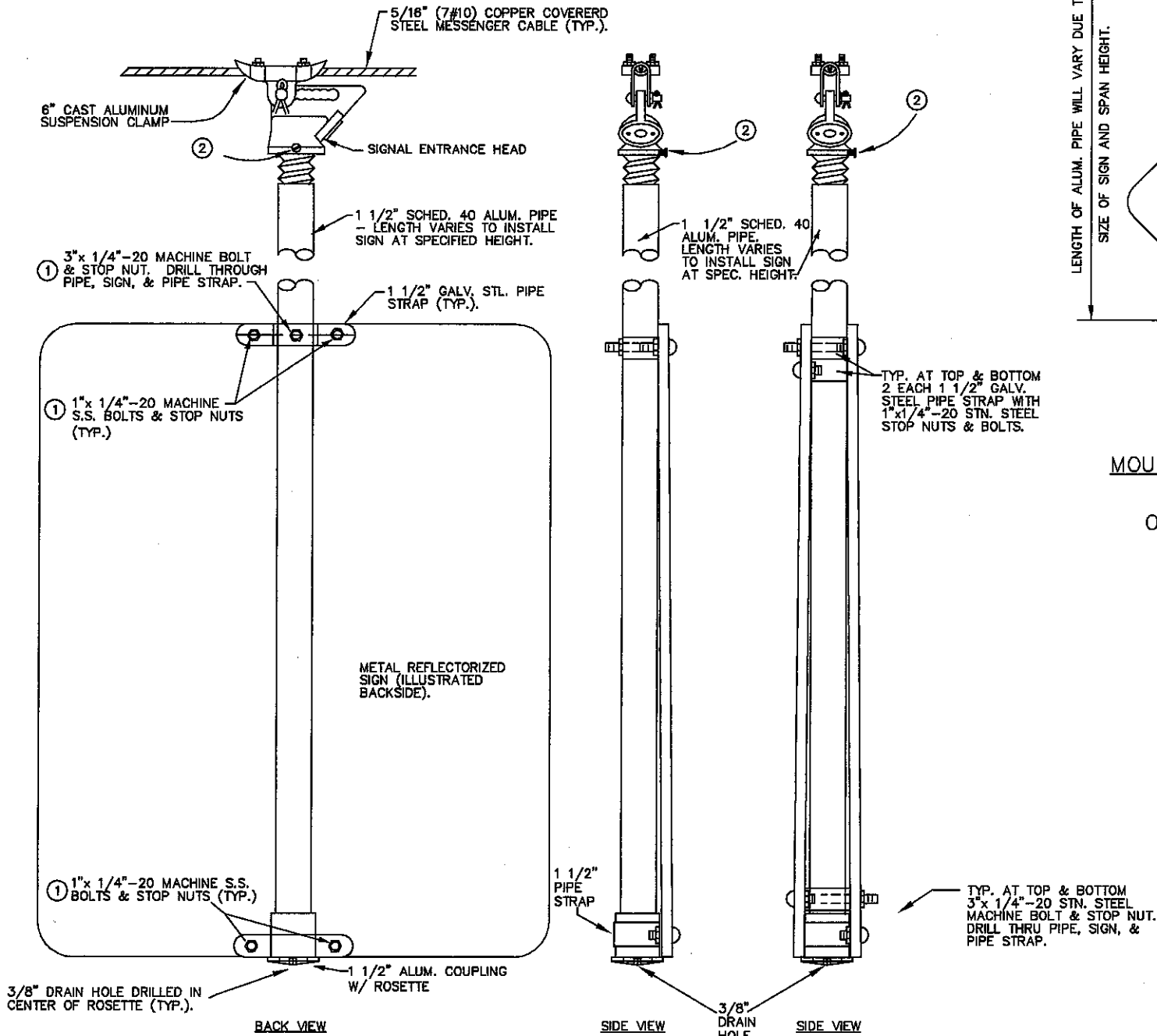
WIRING CODE & SPLICING DETAIL

CITY OF CINCINNATI
DEPT. OF TRANSPORTATION & ENGINEERING
DIV. OF TRAFFIC ENGR.

APPROVED: *Steve Bailey* DATE: 3-4-99

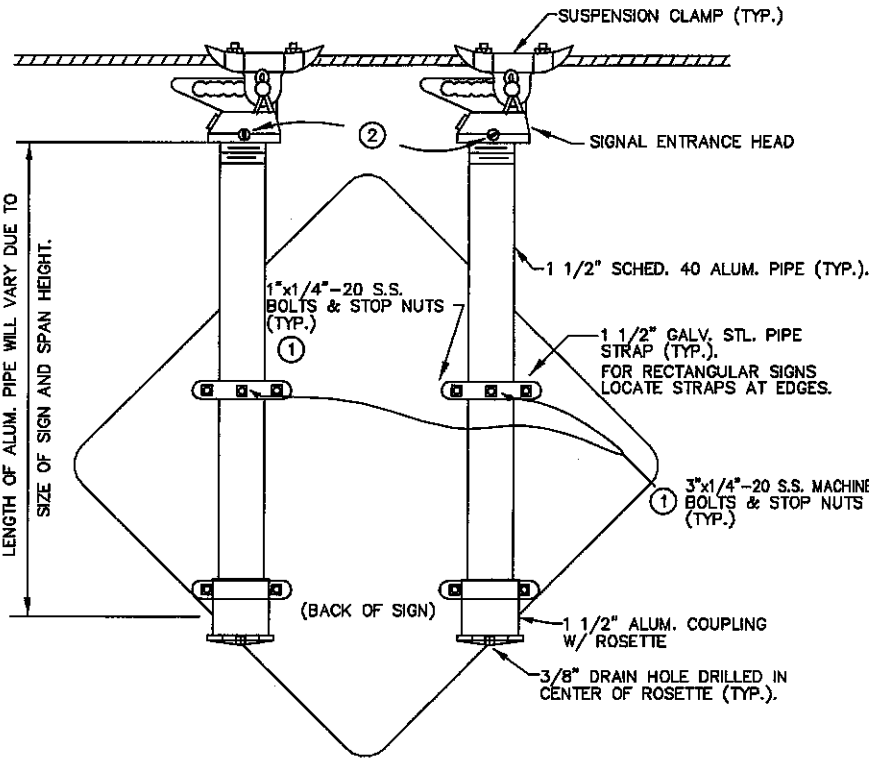
NOTES:

- ① ALL BOLTS, STOP NUTS, AND WASHER SHALL BE STN. STEEL. ALL PIPE, SCHED. 40 ALUMINUM.
② 1/4" x 20 STAINLESS STEEL SET SCREW.

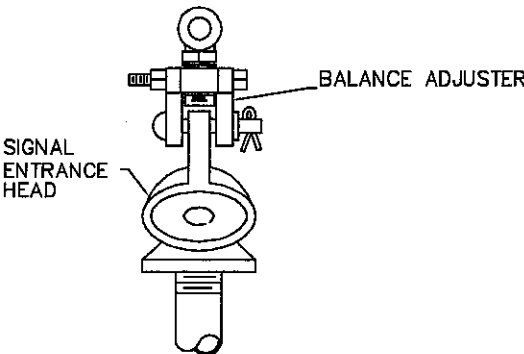


TYPICAL INSTALLATION
STANDARD REFLECTORIZED SIGN
(SIZES 24"x24", 24"x30")

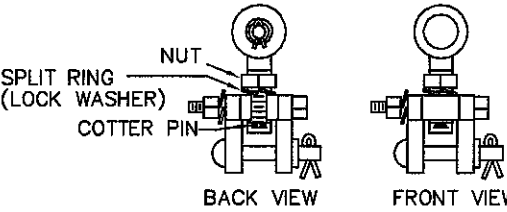
BACK TO BACK
(DOUBLE FACE)
SIGN ATTACHMENT



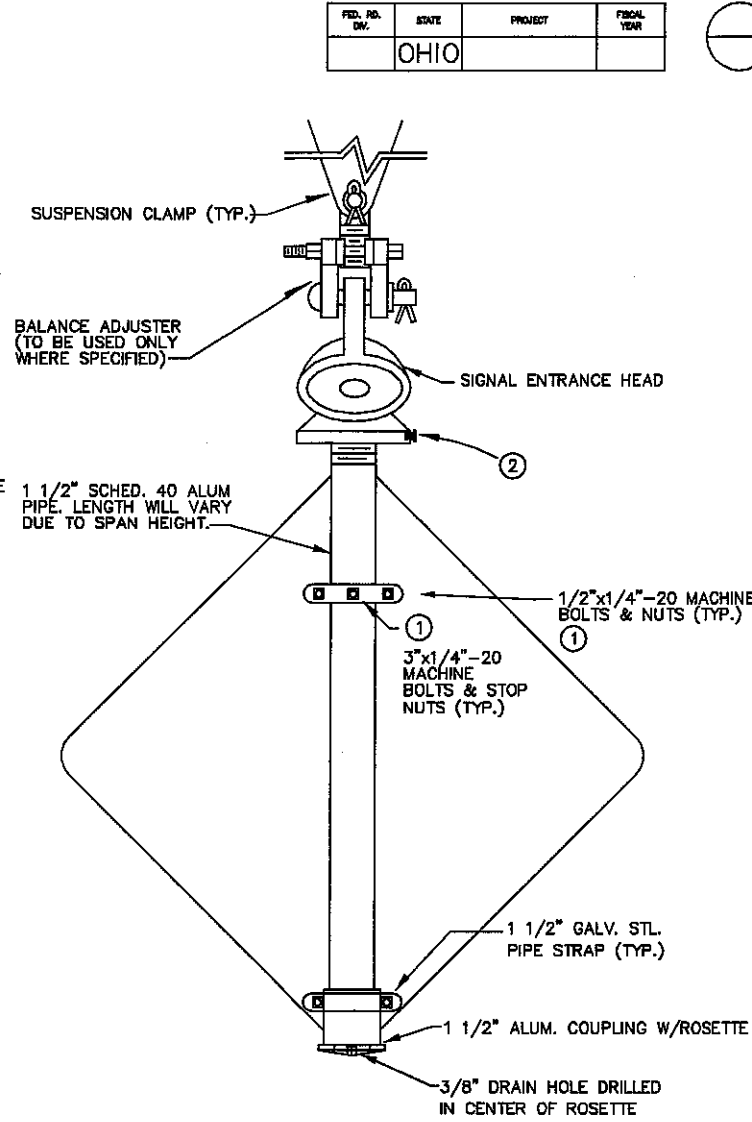
MOUNTING FOR LARGE DIAMOND-SHAPE SIGN
(SIZES 30"x30", 36"x36")
OR STANDARD SIGNS WIDER THAN 24"



FRONT VIEW OF
BALANCE ADJUSTER &
SIGNAL ENTRANCE HEAD



GALV. BALANCE ADJUSTER



MOUNTING FOR SMALL DIAMOND-SHAPE SIGN
(SIZE 24"x24")



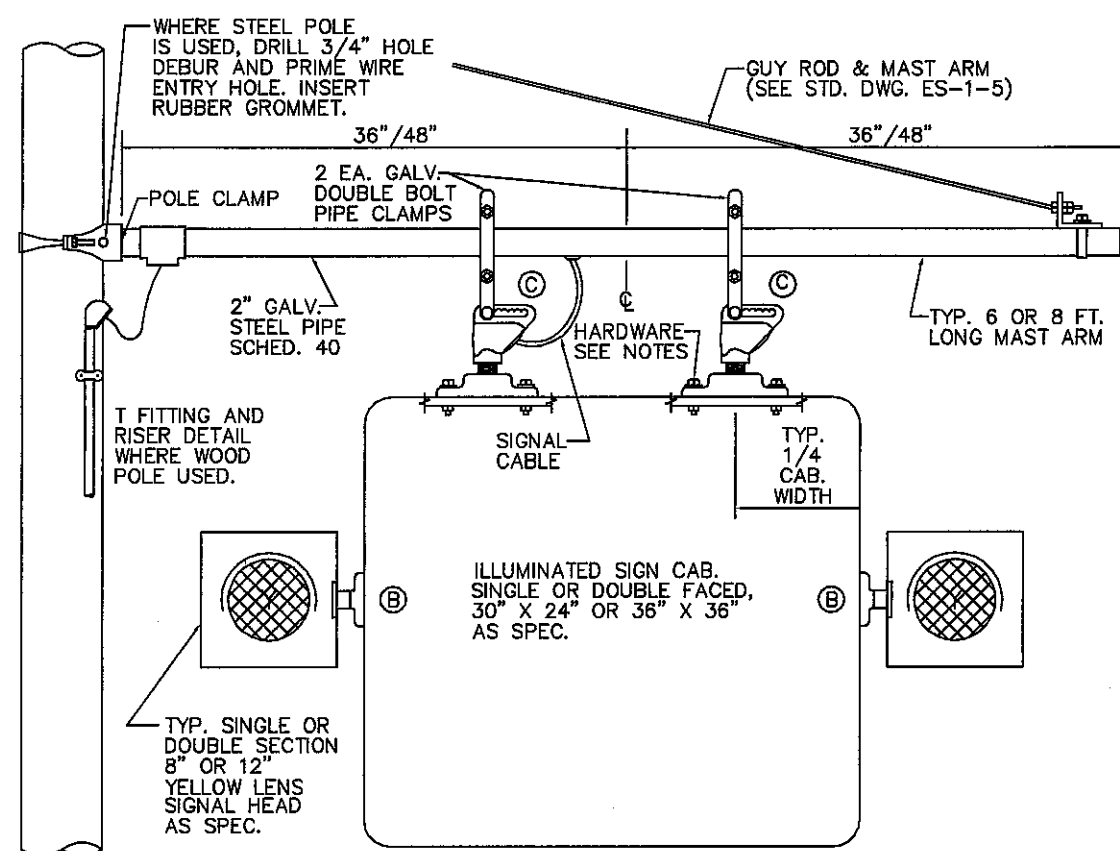
TRAFFIC SIGNAL INSTALLATIONS (ES-3)

REFLECTORIZED SIGN
INSTALLATION DETAILS

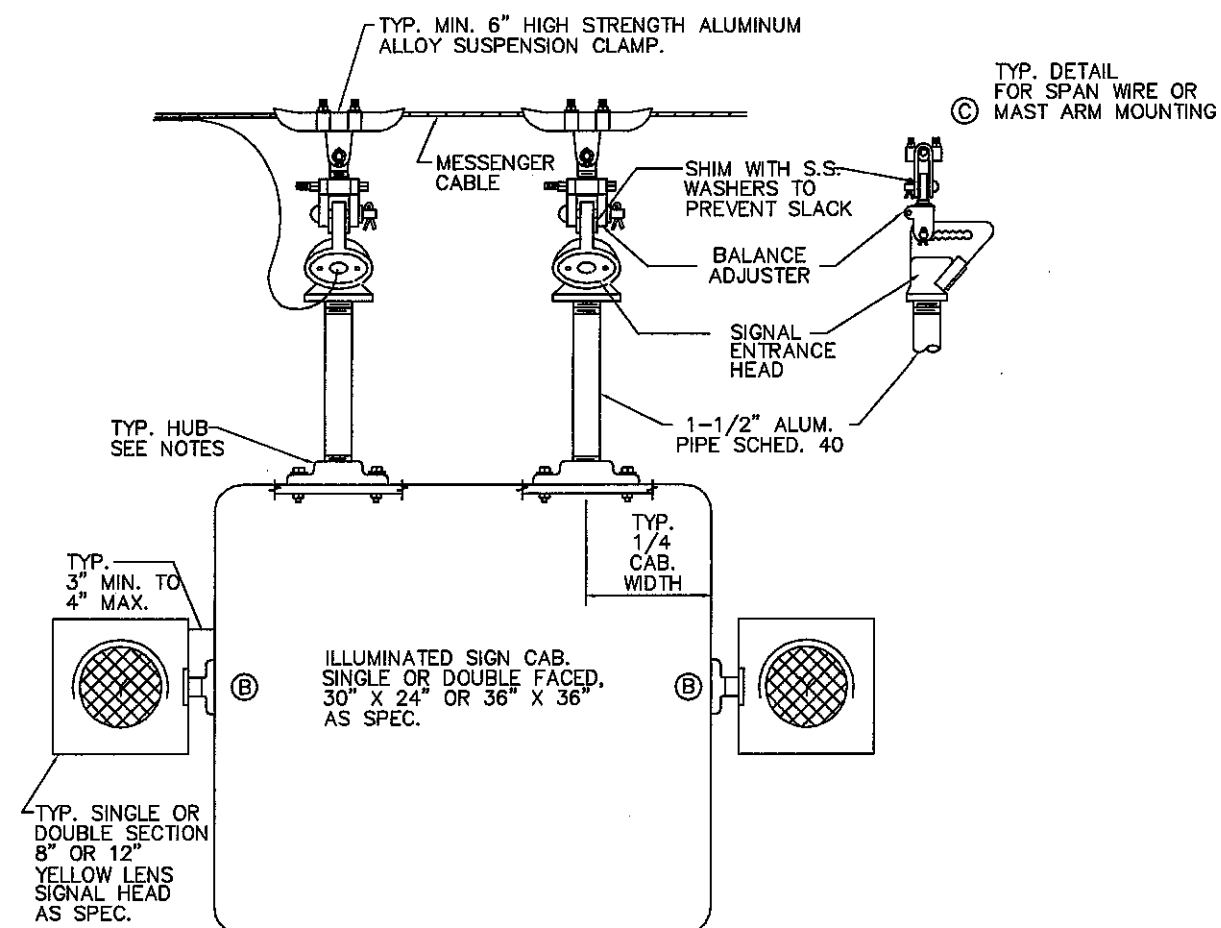
CITY OF CINCINNATI
DEPT. OF TRANSPORTATION & ENGINEERING
DIV. OF TRAFFIC ENGR.

APPROVED: *Steve Bailey* DATE: 3-4-99

DESIGN	REVISION	DATE	WO #	SCALE	SOURCE	DRAWN	FILE NO.
S.C.H.	80ms	9/15/04	UPDATE				
T.E.		3/1/98					
R.R.R.	APPROVED	12/06/94		N.S.			ES-3-10A



TYP. MAST ARM MOUNTING
(ALSO SEE STD. DWG. ES-1-5)



WARNING SIGN & SIGNAL INSTALLATIONS
TYP. SPAN WIRE MOUNTING

GENERAL NOTES

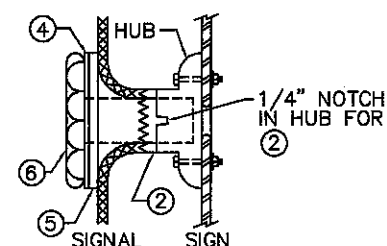
SIGNALS AND OR WARNING SIGN & SIGNALS SHALL BE INSTALLED WITH 17 FEET OF CLEARANCE TO PAVEMENT GRADE. IF MOUNTED TO SPAN SHOULD BE 17' FROM STREET AND/OR LEVEL WITH OTHER EQUIPMENT ON SPAN.

STEEL PIPE & FITTINGS SHALL BE GALV. SCHED. 40. OR SCHED. 40 ALUM. PIPE WITH ALUM. FITTINGS.

ALL HARDWARE FOR SECURING HUBS TO SIGN CABINETS SHALL BE STAINLESS STEEL NUTS, BOLTS & WASHERS SIZED TO HUB OPENINGS.

HUBS SHALL BE SIZED TO 1-1/2 INCH PIPE. PROVIDE ENTRANCE HOLE (1 INCH) FOR WIRE ENTRY INTO SIGN CABINET. SECURE WEATHERPROOF SEAL OF HUBS TO SIGNS WITH GASKETS.

② TYP SIGNAL TO SIGN ATTACHMENT DETAIL

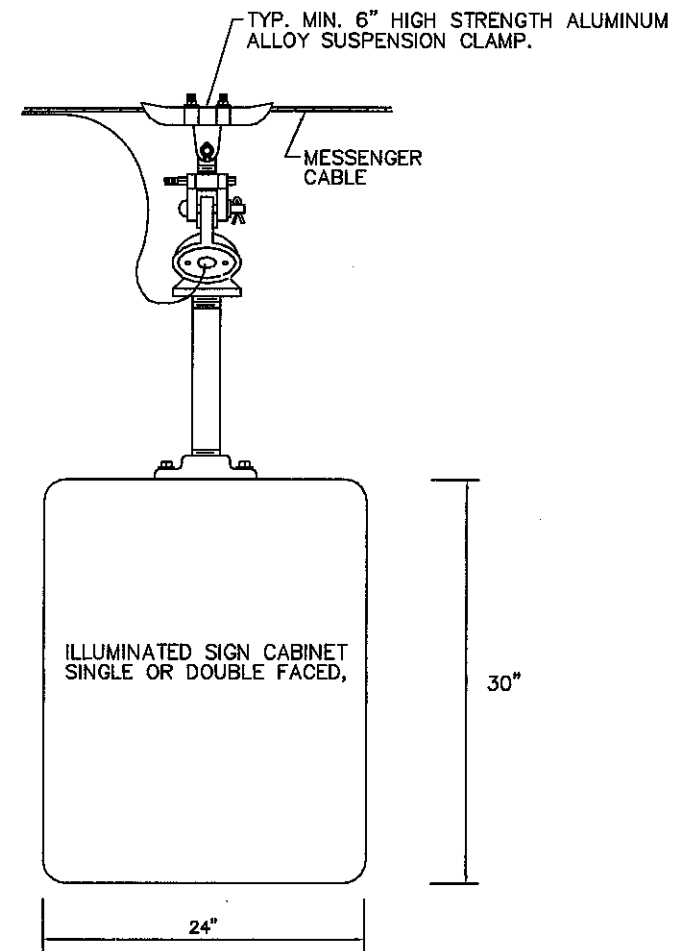


TRAFFIC SIGNAL INSTALLATIONS (ES-3) SPECIAL TRAFFIC SIGNAL & SIGN ARRANGEMENT DETAILS

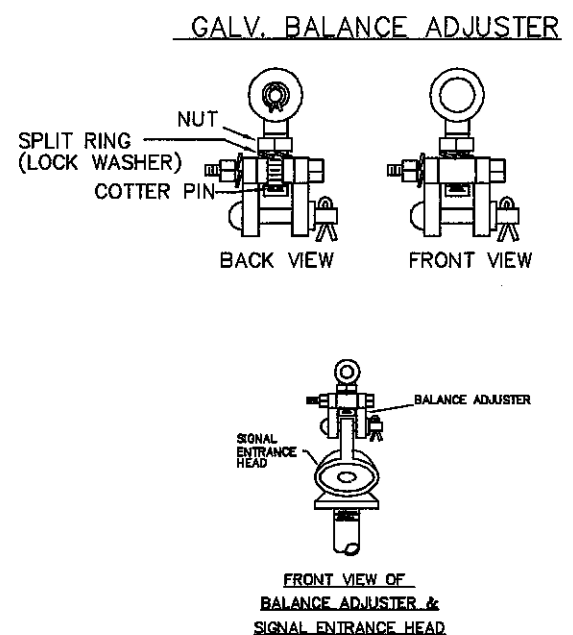
CITY OF CINCINNATI
DEPT. OF TRANSPORTATION & ENGINEERING
DIV. OF TRAFFIC ENGR.

S.C.H.	8/30/04	UPDATE							
T.E.	3/1/98								
DESIGN	REVISION	DATE	WO #	SCALE	SOURCE	DRAWN	FILE NO.		
R.R.R.	APPROVED	6/26/92			NEW STANDARD	CDS ASSOCIATES	ES-3-10B		

APPROVED: *Steve Bailey* DATE: 3-4-99

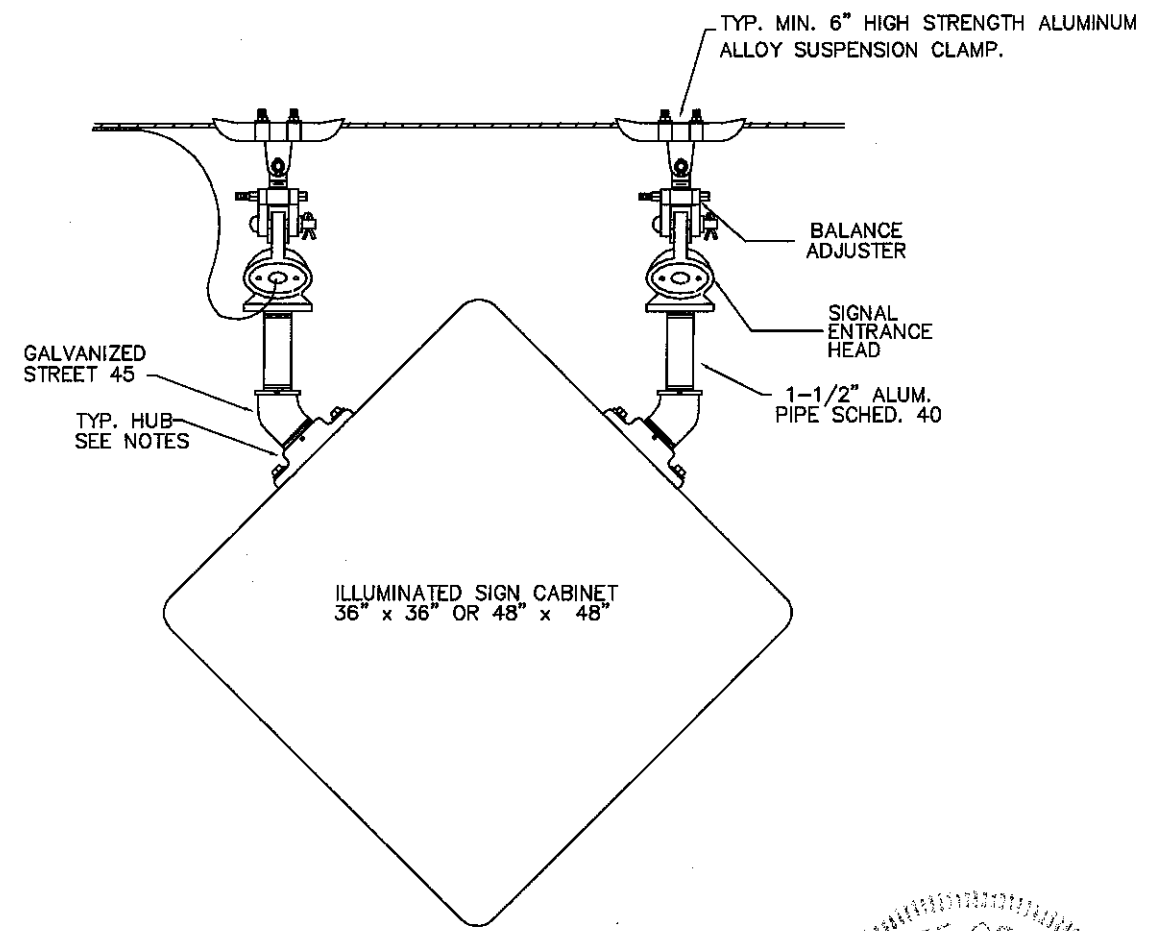


TYP. 24" x 30" ILLUMINATED
SIGN MOUNTING

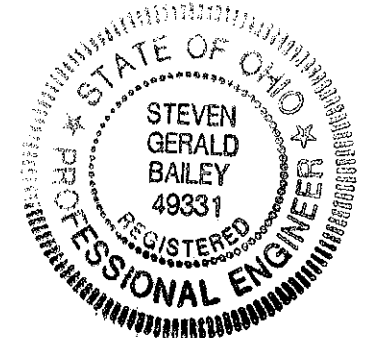


GENERAL NOTES

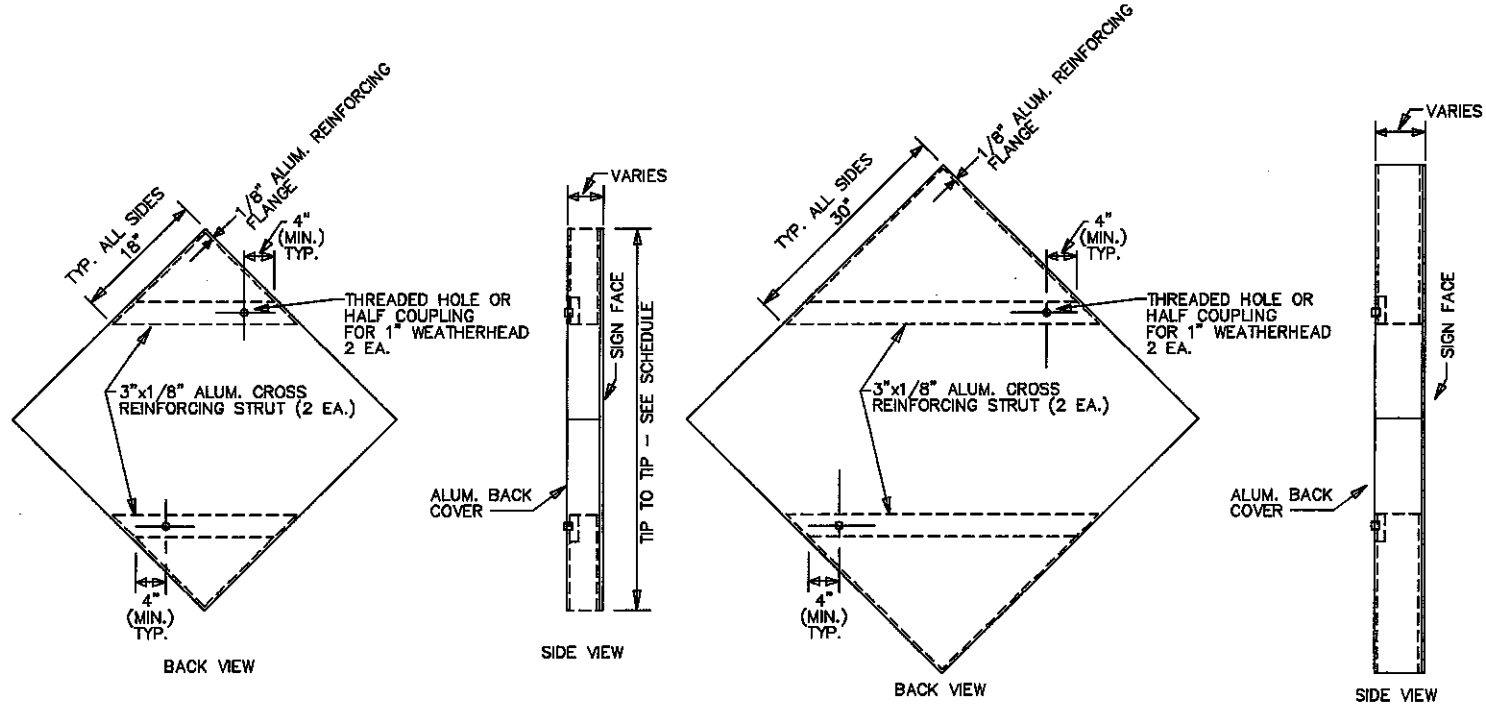
- SIGN SHALL BE INSTALLED WITH 17' CLEARANCE TO PAVEMENT, AND/OR LEVEL WITH OTHER EQUIPMENT ON SPAN.
- ALUM. PIPE & FITTINGS SHALL BE SCHED. 40
STEEL PIPE & FITTINGS SHALL BE GALV. SCHED. 40.
- ALL HARDWARE FOR SECURING HUBS TO SIGN CABINETS SHALL BE STAINLESS STEEL NUTS, BOLTS & WASHERS SIZED TO HUB OPENINGS.
- HUBS SHALL BE SIZED TO 1-1/2" PIPE. PROVIDE ENTRANCE HOLE (1") FOR WIRE ENTRY INTO SIGN CABINET. SECURE WEATHERPROOF SEAL OF HUBS TO SIGNS WITH GASKETS.



TYP. INSTALLATION OF
DIAMOND SHAPE
ILLUMINATED SIGN



TRAFFIC SIGNAL INSTALLATIONS (ES-3)							
TYPICAL ILLUMINATED SIGN INSTALLATION							
CITY OF CINCINNATI DEPT. OF TRANSPORTATION & ENGINEERING DIV. OF TRAFFIC ENGR.							
S.C.H.	8/30/04	UPDATE	APPROVED: _____ DATE: _____				
T.E.	3/1/98		SCALE	SOURCE	DRAWN	FILE NO.	
DESIGN	REVISION	DATE	WO #				
R.R.R.	APPROVED	6/26/92		NEW STANDARD	CDS ASSOCIATES	ES-3-10C	



36x36D
50.9 INCH DIAG. DIM.

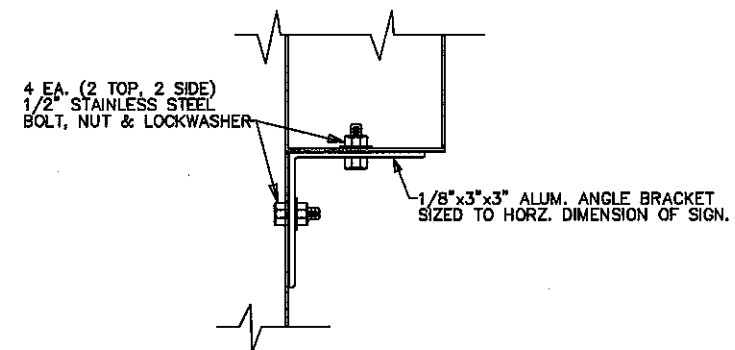
48x48D
67.9 INCH DIAG. DIM.

NOTE:
ALL ALUMINUM REINFORCING FLANGES & STRUTS SHALL BE WELDED TO CASE. CROSS STRUTS SHALL BE WELDED AGAINST SIGN BACK COVER WITH HALF-COUPLING (FOR WIRING) PROJECTING THRU BACK OF SIGN.

SIGN DIMENSIONS

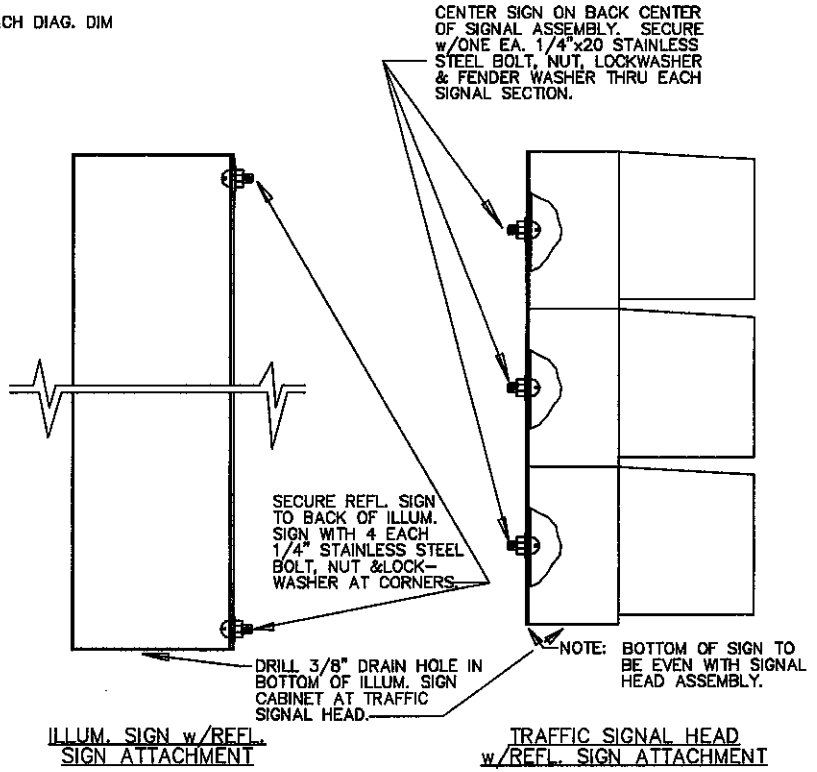
DIAGONAL TIP TO TIP FOR DIAMOND SHAPED SIGN.	
36"x36"D	50.9 INCHES
48"x48"D	67.9 INCHES

INTERNAL REINFORCING FOR DIAMOND SHAPED INTERNALLY ILLUMINATED SIGNS



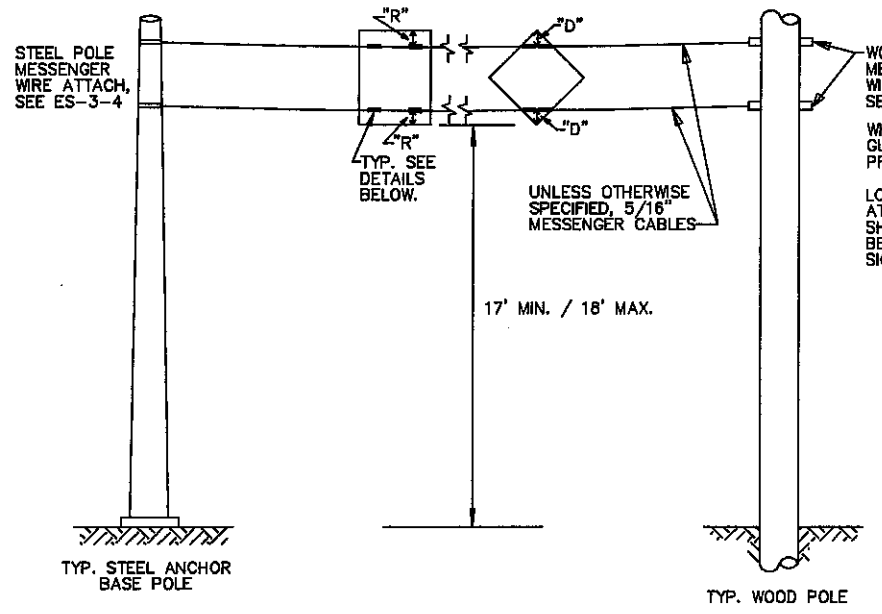
TYPICAL DETAIL OF REFL. (EDUCATIONAL PLAQUE) SIGN ATTACHMENT TO ILLUM. (SYMBOL) SIGN.

SECURE LOWER AUXILIARY SIGN TO UPPER ILLUM. SIGN WITH ALUMINUM ANGLE BRACKET & HARDWARE. PAYMENT SHALL BE INCIDENTAL TO ILLUM. SIGN.



TYPICAL DETAIL OF REFLECTORIZED SIGN ATTACHMENT TO ILLUMINATED SIGNS OR TRAFFIC SIGNAL HEADS

NOTE: PAYMENT FOR THE ATTACHMENT SHALL BE INCIDENTAL TO THE ILLUMINATED SIGN OR SIGNAL HEAD

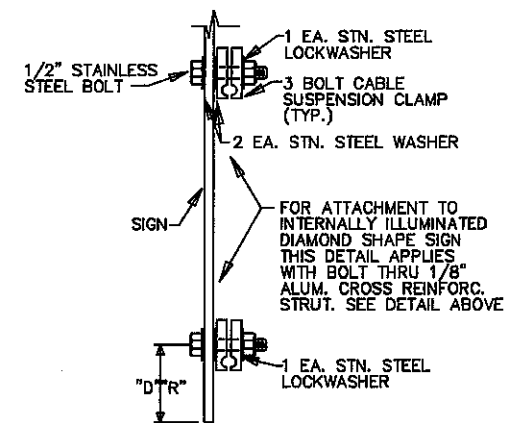


TYPICAL DOUBLE MESSENGER WIRE SIGN SUPPORT DETAIL

WHERE WOOD POLES ARE USED, GUYING MAY BE NECESSARY TO PREVENT EXCESS POLE BOWING.

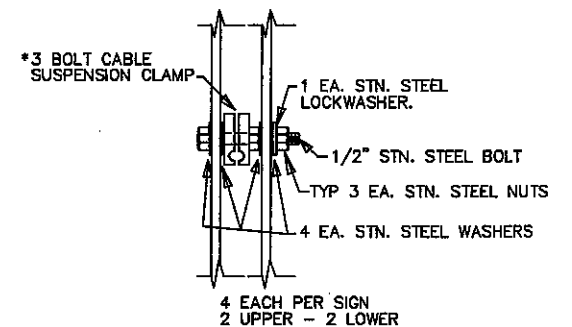
LOWER SPAN ATTACHMENT SHALL NOT BE BELOW SIGN.

- NOTES
- FOR MESSENGER WIRE AND 3 BOLT CLAMP DETAILS, SEE STANDARD DRAWING ES-3-4.
- DOUBLE MESSENGER WIRE SIGN SUPPORT DETAIL
1. INSTALL TOP MESSENGER SPAN FIRST WITH MIN. SAG.
 2. HANG SIGNS AND TIGHTEN BOTTOM SPAN ON DOWNWARD ANGLE SO THAT BOTH UPPER AND LOWER SPANS ARE PULLED TAUGHT.
 3. POLES WILL BOW SLIGHTLY AND SHOULD NOT BE OUT OF PLUMB BUT KEEP SPANS TIGHT.
 4. WOOD POLES MAY REQUIRE GUYING



TYPICAL UPPER AND LOWER ATTACHMENTS

- "D" DIAMOND (OR OCTAGONAL) SHAPED SIGN
- 36"x36"D SIGN - 12 3/4"
 - 48"x48"D SIGN - 21 1/4"
- "R" RECTANGULAR SHAPED SIGN
- 30"x36" SIGN - 6"
 - 36"x42" SIGN - 6"
 - 30"x48" SIGN - 8"
 - 36"x60" SIGN - 12"



ATTACHMENT DETAIL DOUBLE FACE SIGN

- * 3 BOLT CLAMP WITH OUTER BOLTS REMOVED OR SINGLE BOLT CLAMP.
- NOTES
1. PREDRILL BOLT HOLES IN BOTH SIGNS
 2. ASSEMBLE ATTACHMENT HARDWARE FOR FIRST SIGN AND SECURE TO UPPER AND LOWER MESSENGER WIRES
 3. BOLT ON 2nd SIGN AND SECURE WITH WASHER, LOCK WASHER AND NUT.



TRAFFIC SIGNAL INSTALLATIONS (ES-3)				SPECIAL SIGN INSTALLATION DETAILS			
S.C.H. 8/30/04 UPDATE				CITY OF CINCINNATI DEPT. OF TRANSPORTATION & ENGINEERING DIV. OF TRAFFIC ENGR.			
T.E. 3/1/98				APPROVED: <i>Steve Bailey</i> DATE: 3-4-99			
DESIGN	REVISION	DATE	WO #	SCALE	SOURCE	DRAWN	FILE NO.
R.R.R.	APPROVED	8/2/90					ES-3-11